# PERSPECTIVES on Science and Christian Faith

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In this issue . . .



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

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2. Authors of *Papers* and *Communications* must submit an original and two copies of their papers for review purposes.
3. Regular Papers should be accompanied by an *Abstract* of not more than 100 words.
4. All manuscripts should be typed double-spaced on good quality 8½ × 11 paper.
5. References should be collected at the end.
6. Figures or diagrams should be clear, black and white, line ink drawings or glossy photographs suitable for direct reproduction. Captions should be provided separately.

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

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# Putting Things in Perspective

As Christians we need to constantly remember that everything we do and say (and write) should be done with the aim of glorifying our Lord. We are to be God-pleasers and not people-pleasers. Yet each of us, whether in business, industry, or academia are under pressure, not only to produce, but to "excel." Such achievement is to be for the glory and reputation of *our* company or *our* institution, and all too often this further degenerates into cut-throat competition to excel for our own glorification. Richard Bube discusses this crucial, contemporary phenomenon and gives us some guidelines for developing a more Christian response to "achieving excellence."

The mind-boggling complexity of our world as revealed in quantum theory and the interaction of chance and deterministic mechanisms has stimulated numerous reevaluations of the meaning of life and why this universe exists. John Templeton and Robert Herrmann discuss some of the contributions from this area of scientific endeavor that help us understand meaning and purpose in the universe. In relation to evolution, these authors discuss the "interplay of apparent randomness and determinism in the processes which appear to have led to the emergence of living things."

To a considerable degree, the impact of quantum theory in physics and astronomy is matched in the life sciences by E.O. Wilson's "sociobiology." Paul and Mary Ellen Rothrock evaluate the theological implications, both positive and negative, of this significant approach to the evolutionary myth of scientific materialism. The Rothrocks help us to see that, as with other false religions, sociobiology has insights that "might complement the Christian understanding of human nature and society."

We don't need to watch many TV documentaries and news broadcasts to be impressed and often disturbed by the manner in which the media tend to handle religious organizations. (Indeed, some of the response to ASA's "Teaching Science in a Climate of Controversy" demonstrates how easy it is to distort and to misrepresent the true intent of any organization.) Jerry Bergman discusses some of the sociological principles of organizations in general, and religious organizations in particular.

We also have some thought-provoking Communications in this issue. Michael Bozack, who (in the March issue) gave us a significant analysis of the implications of the thermodynamic triple point to our understanding of the trinity, gives another intriguing approach to the trinity on the basis of the conjugate properties of matter. Donald Adolphson argues in favor of nuclear weapons as a means ordained by God to preserve world peace, in much the same manner as the Pax Romana was part of God's plan for the Incarnation. Raymond Seeger gives us another of his mini-biographies with a summary of the life of Nicholaus Copernicus.

We have changed the name of our Journal, primarily to indicate more specifically our major purpose: we are not merely an inhouse publication of an organization, but are a vehicle for the discussion of the many aspects of science as they relate to Christian faith. We need to reaffirm that, as evangelical Christians, we are committed to Jesus Christ as the Son of God and the Redeemer of mankind, as well as to the Scripture as our only infallible rule of faith and practice. Within that framework, there are now, and there have been throughout the history of the Christian church, differing views and traditions. In the ASA we encompass a spectrum of perspectives on creation and evolution, church and state, war and peace, Arminianism and Calvinism, and certainly on the highly controversial, recent issues of the ethics of the biotechnological manipulation of the world around us, including animal and human life. If you disagree with the position taken by any of our contributors we encourage you to write: a regular paper, a communication, or a letter. We can't publish everything we receive, but our major guidelines are for clear and concise writing in a spirit of respect and gentleness. We may not always achieve this goal, but that is the end towards which we strive.

WLB

## NEW MANAGING EDITOR: NANCY C. HANGER

*Nancy C. Hanger is a graduate of Gordon College (Wenham, Massachusetts), where she majored in Literature. She grew up in Washington, D.C., and has lived several places since, including Philadelphia and Los Angeles. Previous publishing experience has included freelance editing at Houghton Mifflin and Porter Sargent Publishers in Boston, and several years in bookselling. During her "copious" spare time, she is pursuing a Masters degree in Children's Literature at Simmons College, reads avidly, and is a spinner and weaver.*

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*The truth of the flower is, not the facts about it, be they correct as ideal science itself, but the shining, glowing, gladdening, patient thing throned on its stalk—the compeller of smile and tear. . . . The idea of God is the flower: His idea is not the botany of the flower. Its botany is but a thing of ways and means—of canvas and color and brush in relation to the picture in the painter's brain.*

George MacDonald, *Unspoken Sermons*, third series, "The Truth".

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## NEW BOOK REVIEW EDITOR: RICHARD RUBLE

*Richard Ruble was born in Virginia. In 1964 he received a Doctor of Theology degree in systematic theology from Dallas Theological Seminary; in 1972 he was awarded a Doctor of Philosophy degree in experimental psychology from the University of Arkansas at Fayetteville. Since 1964 he has been employed at John Brown University in Siloam Springs, Arkansas, where he has served as faculty person, division head, and academic dean. Presently he teaches in the departments of Bible and psychology. His hobbies include writing, reading, jogging, and traveling.*

# On The Pursuit Of Excellence: Pitfalls in the Effort to Become No. 1

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*Although the general desire to produce and promote "excellence" is one that everyone in some way supports, the exact meaning of such an endeavor is by no means self-evident. Since consideration of "achieving excellence" is receiving renewed attention, not only in the sphere of industrial management but also in the academic world, it is worthwhile to reflect on the meanings of excellence and the possibly contradictory directions that are indicated by adopting different meanings as goals for action. We are particularly concerned here with the details of the "pursuit of excellence" in the fields of science and engineering in the university. We choose these fields as specific examples of a movement that is being pursued with increasing vigor in many different academic career areas. One of the forms that such a "pursuit of excellence" often takes is the desire to be or to become "No. 1" in a particular field, i.e., to be or become superior to all other competitors, which may give rise to some of the more serious problems associated with this perspective. In this paper we reflect on both the general implications of striving for excellence and the pitfalls that may arise through an indiscriminate desire to translate this pursuit into "becoming No. 1."*

## Introduction

Recently there has been a growing discussion of the achievement of "excellence," particularly in relation to management of activities related to business, science and engineering.[1-3] Philosophical perspectives growing out of this discussion appear to be playing an increasingly dominant role in what is expected, whether in an industrial or an academic context. It is necessary to evaluate all such paradigmatic developments in the organization of human affairs from a Christian perspective, so that Christians involved in science, engineering and business may have guidelines rooted in a Biblical perspective rather than simply being carried along by contemporary social trends.

It is the purpose of this paper to consider the implications of different definitions of excellence, and to point out some of the pitfalls that strew the path in the effort to "become No.1."[4]

An examination of a dictionary[5] indicates immediately some rather different choices available in choosing a perspective on excellence, what it is, and what is requires. Consider the following three definitions of closely related words:

> **excel:** *-tr.* To be better than; surpass, outdo; *-intr.* To surpass others; be better or do better than others.

**excellence:** The state, quality, or condition of excelling; superiority; pre-eminence.

**excellent:** Being of the highest or finest quality; exceptionally good; superb.

Both "excel" and "excellence" are assumed to involve a "better than" or "superiority" quality, explicitly in the case of "excel," of being or doing better *than others.* In the case of "excellent," however, such a notion of "superiority" is relegated only to the *Archaic* category and instead we are given a definition that points, not to competition, but to the quality of a particular person or thing, the standard of measurement being left unspecified. These two perspectives on the concept of excellence open the way for two quite different approaches: 1) to be excellent is to be better than others, i.e., the judgment is made by comparison between people or things according to some external standard, or 2) to be excellent is to be of the highest quality, i.e., the judgment is made by comparison with an external standard only. This distinction, of course, still leaves open the question of excellence *in what*, the nature or origin of the external standard, and whether or not available resources ought to be factored into the decision concerning excellence.

To apply these thoughts specifically to education, we have a choice between regarding a particular university as excellent only if it is somehow better than all others, or regarding a university as excellent if it satisfies the criteria of highest quality. The former concept naturally leads to the drive to be or become No. 1, since to be No. 1 is the guarantee that the university is indeed better than all others, and hence excellent. The latter concept leads to the evaluation of the university against standards of quality without the intrinsic need to push to be No. 1. For example, many universities might be regarded as excellent without considering any one superior to all others.

Several questions are raised as we continue to investigate this subject.

1. How do we work out the implications of each of the above definitions?

2. What standards of excellence should be used, either in deciding whether one is "better" than another or whether one is "of the highest quality"?

3. What role do available resources play? How do we resolve between "doing the best one can with what one has", "doing better than others with what one has", or "living up to an external standard independent of available resources"?

4. Is it sufficient to focus only on "vocational excellence" or excellence in some limited area of life, or should the ultimate goal of life be excellence "in all of life"?

It is essential to point out at the outset that there can be no question about the Christian basis of a dedication to high quality in service and performance, according to the criteria normally used for such evaluations. Nothing in this paper should be construed in the slightest sense as contradicting this fundamental assertion. If it is concluded that the perspective that I share here means capitulation to mediocrity, I have failed in my effort to communicate. Professional faithfulness, commitment to the task, willingness to make temporary sacrifices for the common good, flexibility toward debatable job requirements that others regard as important (as long as they do not violate basic Christian principles), and dedication to high quality work are necessary consequences of the commitment of the Christian to serve God to His glory in all things.

One of the most valuable inputs that a faculty member can make to a student's development is a sense

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of commitment to the highest quality work of which the student is capable. Here the quality of the work is judged by such common standards as performance on examinations, attention to details, attempts to see the larger picture, seeing a task through to the end, recognition of the important in the midst of the unimportant, and striving to come up with authentic answers to scientific and engineering questions. There can never be a continuing excuse for slipshod work, for lack of caring about the nature of the problems, or for anything resembling laziness in any form.

Nor can the Christian faculty member substitute "Christian activities" as an excuse for failure to meet his or her obligations with respect to professional activities. The faculty member who seeks to excuse unprepared teaching or low-quality research on the grounds that he is involved in faithful Christian witnessing, has missed the point of serving God faithfully in all things.

Having hopefully made this point clear, however, it is necessary now to turn to an analysis of misunderstandings of "excellence"—which would effectively overemphasize one kind of activity at the expense of other equally legitimate activities, or one aspect of life at the expense of others, with the net effect of dehumanizing those involved.

## Meaning of Excellence

Any consideration of excellence must start with the realization that excellence is determined according to the criteria of a particular standard or set of standards. As we have seen above, the meaning of excellence is not derived uniquely from the concept itself, but is given to it according to a choice of standards made quite independently, as these standards are interpreted and judged by those regarded or regarding themselves as authorities. There are two principal sets of standards in this matter, as in many others: 1) the standards of the world, or secular standards, and 2) the standards of God, or Biblical standards. These two need not disagree in every circumstance, but they do disagree frequently in critical points.

Excellence for a Christian, like all other major concepts guiding life, must be related to one's relationship to God, and hence must be ultimately defined in terms of faithfulness, obedience, and commitment to God and His purposes in the world. Such a concept strips excellence of self-pride and considers the potential of the person involved. It also recognizes that excellence is something to be considered in all of the areas of life simultaneously, not simply in one area of life regardless of the others. Such a definition is more like the dictionary definition of "excellence": being of the highest or finest quality, exceptional, superb. It is a matter that rests ultimately on the relationship between a person and God. One's peers may, and indeed will, have their own judgments that may be indicative of the achievement of such excellence, but such peer judgments cannot be taken as the only or last word.

*It is a prominent attribute of a Christian perpective on excellence, that Christians can . . . define excellence in terms of a standard that transcends competition with others.*

Excellence in a secular sense, on the other hand, most often takes on the dictionary definition of "excel" or "excellent": to do or be better than others. We act within this mode in academic life every time we give grades to students, and particularly when we "grade on the curve," so that the definition of an "A" is to have done better than three-quarters of the others in the class. We act within this mode when the motive of competition is the foremost driving force; sports are a paradigmatic situation. Many people grow up with the deeply ingrained conviction given to them at an early age that if they are not the "best" in the world, i.e., if they are not the "boss," or the "president," or "the champion," or the "Nobel Prize winner," or any other such indication of being better than all others in a field, they are essentially failures. It is a prominent attribute of a Christian perspective on excellence, that Christians can (and I believe, should) define excellence in terms of a standard that transcends competition with others, whereas a secular definition of excellence finds its natural expression in terms of a quest for superiority over others. This is a profound and far reaching difference, the effects of which are felt in all of life.

Furthermore, our understanding of the meaning of excellence depends critically on whether we perceive excellence to be describable in the abstract, or whether we recognize that excellence can be evaluated only within a total context of commitments and relationships. Since excellence by itself is essentially open-ended (i.e., no one ever arrives at such a state of excellence, such a high and fine quality, that still further diligence, effort, and devotion would be incapable of achieving an even higher degree of excellence commensurate with one's resources), it is evident that devotion to excellence in the abstract in any particular area of endeavor excludes the achievement of the same

level of excellence in other areas of endeavor, simply due to the limitations of time, strength, and natural ability. Paradoxically, this dilemma might be even worse for the "Christian excellence" proposed above than for "secular excellence." There is *no limit* to the quest for higher and finer quality, whereas if a person once achieves the rank of being better than everyone else in the world, he can then feel that he is as "excellent as possible"! This may not particularly matter if, for example, achieving excellence in playing the piano were to exclude achieving excellence in playing tennis. But the desire to achieve an integrated excellence in all of life, including a variety of nonpersonal and personal relationships, is quite likely to make the pursuit of "high*est* quality" in any one aspect of life exceedingly difficult.

We may pause here to note the tension of this realization. On the one hand, the Christian is committed to high quality in his/her professional field, and at the same time to faithfulness in other areas of life, including a whole constellation of personal relationships. Not only is the Christian faculty member a researcher and a teacher, but the same person also acts in a number of family roles such as son, mother, brother, wife, and a variety of community roles, related to both Christian and non-Christian organizations. If I argue that commitment to high quality does not excuse neglect of personal relationships, I also argue that commitment to personal relationships does not excuse neglect of professional commitments. Staying on the job to complete an experiment does not excuse my absence when my child is rushed to the hospital in an emergency; planning for my wife's birthday party does not excuse my submission of sloppy and incomplete research reports. But since the pursuit of absolute excellence in either professional or personal commitments might each take up one's entire strength and time, how is one to resolve the issue? It is clearly a dilemma calling for creative solutions.[6]

Here we encounter a kind of "Excellence Indeterminacy Principle," by which we realize that we cannot simultaneously achieve the highest levels of excellence in all aspects of life. If a person presses very hard to achieve excellence in the pursuit of a scientific or engineering career, so that he devotes essentially all of his quality waking time to this pursuit, he quickly finds that his relationships with friends and family, for example, rapidly deteriorate. This fact is testified to by the ever growing number of broken homes, divorces, and one-parent families in the midst of an environment where technical excellence receives the greatest loyalty. If, on the other hand, a person strives to achieve some degree of excellence in his scientific or engineering profession, as well as in personal relationships with friends, family, and church community, he quickly finds that he does not achieve that degree of excellence in his profession that he might have if it had been his sole concern. This is presumably, after all, why some individuals feel the call of God to remain single, thus freeing themselves for a more focused pursuit of excellence in a limited sphere of activity.

These points are illustrated by Figure 1. Figure 1(a) illustrates the case where a major portion of an individual's time, concerns and resources are spent in one particular field of endeavor. Not only is the ability to exhibit excellence in other fields decreased, but in several fields the net consequence is to produce what we may colloquially call "negative excellence," which is a term we might use for fields where major failure has been encountered with damage both to the person and to others dependent upon him. A more balanced approach is pictured in Figure 1(b) where it has been recognized that some sacrifice of excellence is necessary in the field of major involvement in order to avoid failures and tragedies in other aspects of life.

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We may push the illustrations of Figure 1 a little further. The total area under all of the bars represents the total ability and time available to a specific person; let us call that his "available effort." A particular person must choose how to distribute that "available effort" across the various areas of concern to him. Devoting effort to one activity inevitably takes effort away from another. By increasing his efficiency and by practicing good habits and disciplines he can increase his "available effort," thus giving a measure of freedom beyond that indicated if one regards the areas of Figure 1 as fixed. However, this contributes at most a variable scale factor and does not remove the basic necessity for choices between areas of concern.

Secular criteria of excellence advise that the preferred course of action with respect to Figure 1 is to maximize the effort devoted to any particular field until one is assured that he is better than anyone else. If the cost of this is creating fields of "negative excellence," that is unfortunate, but is not directly figured

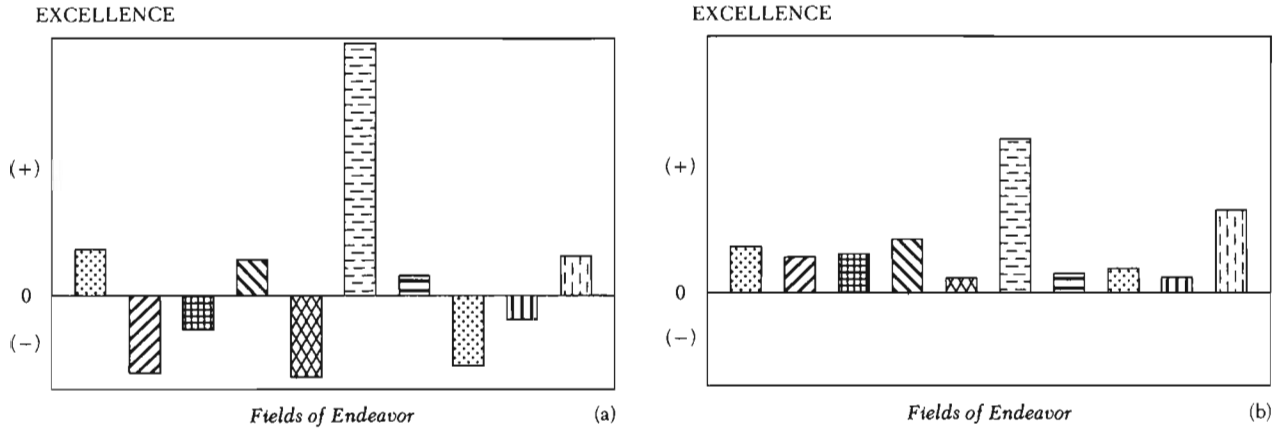


*Figure 1.* Schematic illustrations of choice patterns in major fields of a person's endeavors. The ten bars represent individual areas that require time and effort and in which it is possible to establish excellence. (a) This set of choices represents those made by a person who strives for such a high degree of excellence in one area that other areas may actually experience "negative excellence," i.e. failure. (b) This set of choices represents those made by a person who strives to avoid failure in any area and therefore does not achieve quite as high a degree of excellence in any one area as the person represented in (a). Limitation of time and resources make it necessary for every person to choose between some degree of (a) and (b).

into the evaluation. Christian criteria of excellence, on the other hand, call for a minimization of regions of "negative excellence." If this cannot be accomplished with all due regard to the flexibility of personal discipline and working efficiency, then it must be accomplished by a reduction of the effort devoted to the pursuit of excellence in other fields.

This approach might come under criticism as one that would lead to a leveling of all effort to that of mediocrity. If followed, the geniuses who contributed knowledge, inspiration and insight at the expense of tragic personal lives and broken relationships would not have dedicated their lives to their own field regardless of the cost. So it might be argued that the world would be much the poorer rather than richer. Let me respond only that this approach does not call for mediocrity, but rather for diligence and creativity in achieving excellence in all of life instead of in just some isolated areas; excellence, that is, in terms of a life of highest quality, not necessarily in terms of being better than anyone else.

Sometimes the argument is made that the Christian should "do his best." We should recognize, however, that in the form stated, this proposal does not really help us. If we take it literally, then there are no limits to how much time and effort "doing one's best" can require. If a person is at a certain level of achievement, could he not still do better by devoting more effort to the enterprise? Once again, we can deal with the exhortation to "do one's best," only if we agree on a criterion against which to measure "the best." I have argued here that such a criterion must take into account all of life, and not just a particular field of endeavor.

It is essential for the Christian, therefore, to distinguish clearly between excellence that is focused only in certain aspects of life, and excellence that is related to all of life. Authentic excellence for the Christian cannot exist outside of a holistic relationship with God and others, which is reflected and manifested in all the dimensions of his life. The limitation of the pursuit of excellence to a single field or a single area of endeavor cannot help but squeeze the vitality out of other aspects of life and lead to a one-dimensional lifestyle. Such a lifestyle may be judged "excellent" by human standards, in that the person involved may indeed "be or do better than others" in that particular field, but it cannot be judged excellent by God's standards, which are centrally concerned with the network of relationships between God and men.

It is also necessary to distinguish between the quest for excellence according to God's standards and the quest "to become No. 1," as this is popularly understood and acted out in people's lives. In the case of an academic program in science or engineering, excellence (or, being of the highest quality) is to be judged by the quality of the education through classroom teaching and research, by the quality of the research in selecting and attacking significant issues in a way that contributes to human understanding and abilities, and by the nature of the relationships between faculty members and students, as well as between students themselves. It is not a matter to be judged ultimately by

a poll of leading university presidents or deans, who look at the enterprise primarily from the outside, or by some kind of statistical optimization, but by the effect on the lives of the faculty and students who are involved.

Becoming No. 1, on the other hand, has in its very semantics a spirit of competition in which public relations and politics play as large a role as the quality of personal relationships—judgment is carried out by external criteria, frequently related only indirectly to the fundamental purposes of education as listed above. To think seriously of "becoming No. 1" is more reminiscent of the transient world of sports, or of the area of national pride, than it is of an academic institution. There is the danger that the press release may become more important than the scholarly publication, that the research fad of the moment may replace the impact on the future, and that the political give-and-take of the reception line may be more significant than the technical seminar.

## Biblical Perspectives On Excellence

There are so many dimensions to the concept of "excellence" that it is not surprising that different English versions of the Bible disagree on whether or not it is the best word to translate the original language. As one set of illustrations of its use, we use the Revised Standard Version.

By its relative absence in the Old Testament, we may note first that the concept of "excellence" was not central to Hebrew thinking. This is probably because the word is too abstract, and too distant from the close walk with God and His concerns for the world that characterize the Old Testament. One reference is found in Isaiah 28:29:

> This also comes from the Lord of Hosts; he is wonderful in counsel, and excellent in wisdom.

Here excellence is associated with the concept of wisdom, one of the most vital of the Old Testament insights. Today we tend to overvalue knowledge for its own sake; the Bible keeps us straight in recognizing that wisdom, true understanding, requires knowledge but is far more valuable. To be "excellent in wisdom" is indeed to live a whole life illuminated by the presence of God. This same kind of input is obtained from Romans 2:18, where out of the relationship with God should come knowledge of His will and approval of "what is excellent."

It there is anything in the Bible that occupies a higher place than wisdom surely it must be love. It is fitting, therefore, that having described various kinds of Christian activity, knowledge, and function in I Corinthians 12, Paul concludes that chapter with the words, "And I will show you still a more excellent way." He then continues with the well-known "love chapter" of I Corinthians 13. Can any way that is not characterized by love be called an "excellent way?" This triumvirate of knowledge, wisdom and love is again tied together in Philippians 1:9–10:

> And it is my prayer that your love may abound more and more, with knowledge and all discernment, so that you may approve what is excellent, and may be pure and blameless for the day of Christ.

Later in Philippians 4:8, Paul gives a listing of qualities, one of which is excellence:

> Finally, brethren, whatever is true, whatever is honorable, whatever is just, whatever is pure, whatever is lovely, whatever is gracious, if there is any excellence, if there is anything worthy of praise, think about these things.

When we speak of excellence, it is appropriate, therefore, that we recognize the type of qualities that are Biblically associated with the word.

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Although the concept of excellence is not specifically mentioned in it, the Parable of the Talents (Matthew 25:14–30) is certainly an extremely relevant one to the present considerations. In particular, it helps us to understand what "doing one's best" means and emphasizes the role of gifts and resources in what is required of a person. Each person is called upon to use his gifts and resources in service to God and his fellows, and faithfulness to this call requires full commitment of those gifts and efforts. But the standard of "the best" is not the same for any two people, being judged by the individual gifts and resources at the disposal of each. This is equivalent to our previous remarks about the total area in Figure 1 being a variable from person to person.

## Pitfalls in Becoming No. 1

In order to see in more detail the relevance of these considerations for the quality and excellence of academic life, we look now briefly at some of the pitfalls

that can befall a devotion to "becoming No. 1." Each of these pitfalls does not stand by itself, and it is expected that there is considerable overlap and interaction between them.

### *Connotations of "Becoming No. 1"*

The phrase, "becoming No. 1," comes to us primarily from the environment of sports. There a particular individual or team is accorded the distinction of being No. 1 on the basis of the best won-lost record in competition, or of victory over other individuals or teams who were also seeking the distinction of being No. 1. These accomplishments are interpreted to mean that the winner is superior to all others. The status is quite transient, since the No. 1 individual or team of one year may be far from No. 1 in the very next year, even in the same sports context.

The criteria for being declared No. 1 are fairly straightforward, consisting of some kind of numerical score in a particular sports contest. When the concept of being No. 1 is pursued by an academic institution, many of these same kinds of motivations and implications become involved.

### *Loss of Personal Relationships*

Because "becoming No. 1" for an academic institution depends almost by definition upon the perception of other people (who judge that the institution is indeed better than all others), the quest to "become No. 1" often focuses on external impressions caused by activities on campus. It is therefore essential that a program be planned that will produce the maximum public notice. Such public notice is much more commonly associated with exciting developments, major professional achievements, the winning of prizes by the faculty, and the involvement of the faculty in a variety of professional and semi-professional activities away from the campus. The quiet and regular development of professional awareness of students and of personal relationships between faculty and students, or between faculty and faculty for that matter, does not register high on the external impact meter. Indeed, the time required for such relationships to develop detracts from the time that could be spent on activities more likely to result in recognition as No. 1.

High priorities are placed on techniques that allow the institution to carry out its formal duties of education without causing this enterprise to take up too much time of the faculty, who can be freed for activities more likely to contribute to recognition. Sometimes this is called "lightening the load on the faculty," but frequently it represents only a shifting of the load from building relationships within the educational and research context to carrying on activities more likely to receive public applause. Instead of being used as enrichment for the educational process, computers and teaching assistants often become substitutes for the faculty's time, interest, and commitment. At the same time that the institution is receiving the kudos of external judgment as No. 1, it may be seriously failing in its basic commitment to the task of education, whether in the classroom or in the research laboratory.

*There is the danger that the press release may become more important than the scholarly publication, that the research fad of the moment may replace the impact on the future, and that the political give-and-take of the reception line may be more significant than the technical seminar.*

### *Students as Products*

It is perhaps not uncommon for a person to seek a faculty position in science or engineering, in contrast to a research or development position in industry, because he or she prefers to be involved in the professional and personal development of human beings rather than being devoted almost solely to the development of impersonal objects for commercial merchandising. It is true that a person who becomes a faculty member in a "research university" rather than a "teaching college," appreciates the significance of carrying out valuable and meaningful research and understands the necessity for providing time and effort to all of the related activities, not the least of which is the constant quest for research funding. But even in the setting of a "research university," it is not unreasonable to suppose that a major purpose of research is to aid in the development of new scientists and engineers, which is certainly at least partly accomplished by personal interactions.

The quest to become No. 1 often cancels the principal motivation of this desire. Instead of seeing the development of students into whole persons as the "product" of the institution's program, students may indeed be viewed as dehumanized products, used as a relatively inexpensive pair of hands in university research contracts and then effectively programmed at the institution for the benefit of interested industry.

Just as the industry requires raw materials and equipment, so also it requires the input of people trained to fill required niches in the industrial program. In such a perspective, the education of students in any broader sense, or the development of meaningful faculty–student relationships, may come to be regarded as irrelevant to the institution's task. It is relatively easy for the situation to develop where a principal criterion used in judging whether or not the institution is No. 1, is how successfully it supplies major clients with the manpower they require. The average starting salary of its graduates, as they go on to positions in industry, may become one of the major statistics used in judging the rank of an institution.

*The quiet and regular development of professional awareness of students and of personal relationships between faculty and students, or between faculty and faculty for that matter, does not register high on the external impact meter.*

*Research as Public Relations*

Specific topics or areas of research can be chosen at a university for a variety of different reasons. The typical faculty member at an institution dedicated to being No. 1 would probably reply that he or she chooses research projects primarily on the basis of how important they are perceived to be; this is often equivalent to how much attention will be attracted in the external world by research success. Research in "hot topics" of the day is automatically favored over research on other topics, perhaps with more long-term significance. Certainly students are not benefited by being involved in research in dead fields, but there easily comes into being a "tyranny of the novel," in which everything new is judged good and every fad faithfully followed. There is a general unwillingness to consider the value of other research, equally capable of obtaining contract support and resulting in high-quality, publishable material, while perhaps better serving to help students develop research and engineering skills.

Whether or not a possible research program is suitable for student development may arise particularly when such a program is proposed by a prominent industrial connection of the university. There may be a strong temptation to accept such a program because of a desire to please the industrial connection, without due regard for the overall suitability of the program for student growth.

Another view of research sees it is being part of the educational process, so that a faculty member may respond that he or she chooses a particular project at least partially with a view to how suitable this project would be for student research and education. Presumably no one deliberately works in uninteresting fields that no one else cares about, but there is a difference between doing research for the public relations benefits, and doing research for the sake of the development of student researchers and engineers, with more concerns than simply the technical ones of how to get a particular job done.

*The "Give 100%" Syndrome*

Every major human endeavor that sees people as tools in the pursuit of commercial or ideological goals, rather than viewing people as whole persons with a variety of needs and capabilities, tends to emphasize the necessity for these people to devote 100% of their time and energies to the activities of that endeavor alone. It does not matter what kind of human endeavor is chosen to test this statement. It is true of the totalitarian national goverment that demands total loyalty (as defined by the government) in all aspects of life, of the industrial company that desires to maximize profit by total subjection of the lives of its employees to the goals of the company, even of the church community that regards its own development and survival as the only concern worthy of its members' efforts. It takes the form of the apparently reasonable statement: "If you are going to be part of this organization and be supported by it, then you should be ready to give it 100% of your energy, time, and ability."

*Research in "hot topics" of the day is automatically favored over research on other topics, perhaps with more long term significance.*

Such a demand can be just as true of an academic institution as of the others just mentioned. Such 100% devotion is often regarded as essential to success in becoming No. 1. The cost of such 100% devotion, however, is broken relationships and shattered lives.

"Outside interests," which may include in practical cases friends, family, community and church, as well as worthy causes, social movements, political organizations, and international activities—are viewed with suspicion. They are seen to indicate lack of loyalty, trustworthiness, serious commitment, and general suitability of the person found guilty of harboring such interest, and—worse yet—taking time away from the goal of becoming No. 1 to attend to them. Human priorities in which the nation, the company, or the institution are not ranked first are criticized as unworthy of a member of the select group.

### *Competition*

"Nice guys finish last," is the sometimes conventional wisdom of the sports world. All too often the desire to become No. 1 means essentially the same thing. When becoming No. 1 is the main concern, the final end that justifies all means, then the intense spirit of competition between people who might otherwise be cooperating together is a natural consequence. In the worst cases, we may actually see the deliberate denigration of others in order to advance our own progress toward No. 1. However appropriate or inappropriate this attitude may be judged to be in the sports world, or—perhaps some might add—in the business world, the threat that it might become a major ingredient in the academic world in the pursuit of becoming No. 1, means that far more has been lost than can possibly be gained.

My comments critical of a spirit of competition in this paper should not be interpreted as an argument that all competition *per se* is improper and self-destructive. There is indeed a healthy spirit of competition that spurs us on to greater effort and adds zest and excitement to the process. This kind of competition can, however, be readily distinguished from the common destructive kind by invoking another phrase from the world of sports: "It's not who wins or loses, but how well you play the game." If winning in competition is needed to convey personal worth, while losing in competition removes personal worth, then that kind of competition is destructive. Positive competition is the kind that results in a joint celebration of winners and losers after the contest, as they all share together in the sense of achievement given by the knowledge that all have done their best.

### *The "Best Person in the World" Syndrome*

Sometimes the desire to become No. 1 causes a university to state that it wants to hire to its faculty only "the best person in the world." Such a label implies that the person being considered is so regarded by other people around the world, whose contacts are generally limited to the professional visibility of the individual. But this leaves several important questions unanswered. Is the "best person in the world," according to these criteria, the most able to help students develop into whole human beings with an appreciation for the values of life and their profession, or is "the best person in the world" the most flamboyant, unifocal person dedicated to giving 100% toward making the institution No. 1?

*Growth is certainly not evil in itself, but growth for its own sake may become a very definite pitfall.*

### *Bigger Is Better*

Finally we may note that the desire to become No. 1 and be better than all others is frequently translated into the determination to become bigger than all others. This is probably an expression of the common judgment, "Grow or die." The quest for more money, more buildings, more faculty, more students, and more programs is often the expression of the pursuit of excellence and the effort to become No. 1. Again, growth is certainly not evil in itself, but growth for its own sake may become a very definite pitfall. When it comes to authentic excellence, the 50-member research group may not provide as excellent a maturing environment for students as the small research group interactions between students and faculty, and the 300-student lecture class may offer a less valuable experience than the 10-student seminar.

## Summary

Profound issues are raised in dealing with the pursuit of excellence. A person's entire world view is involved in responding to these issues, and Christian perspectives may frequently be quite different from those of the secular world.

First, there is the question of what constitutes excellence. A common secular response is to regard excellence as the state of being better than anyone else. Competition between people is the framework in which excellence is defined, and the achievement of excellence requires, in the last analysis, being recognized as No. 1. The Christian perspective sees excellence rather as the state of being of the highest quality as measured by the standards of God. There is no necessity for superiority of one person over others, and no particular virtue in being labeled No. 1.

Second, there is the question of how excellence is judged. In a secular framework, excellence is judged by the opinions of other people. In particular areas some direct quantitative measure of excellence may be agreed upon, but this also represents the opinions of those constructing the quantitative measure. The Christian perspective measures excellence against the standards of God. In fact, it begins with the recognition that no one is by nature excellent before God, but that by His grace in Jesus Christ and by the power of His Holy Spirit, we may serve Him to His glory in all that we do. The opinions of other people may indeed be helpful in guiding a person in the pursuit of excellence, but they do not constitute the final decision.

Third, in a secular perspective excellence can be viewed by considering one part of life at a time. A person may be judged to be an excellent physicist at the same time that he is judged to be a complete failure as a husband and father. People are rewarded for maximizing areas of excellence in life without taking any special care for other areas in which failure results. Excellence is task-related, and there is little vision of excellence in all of life as a major goal. For the Christian, excellence in all of life is the goal. Excellence in specific aspects of life is to be maximized only insofar as such maximization is consistent with the minimization of unfaithfulness to responsibilities, broken relationships, failed commitments, and insensitivity to others' needs.

If an academic institution chooses to follow the directions laid down by the secular perspective, it becomes quite a different place than if it had followed the Christian perspective. The deliberate choice to become No. 1 enters a university on a treacherous path scattered with many pitfalls. Individuals concerned for the quality and effects of education should carefully consider the implications of this choice.

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*The endless cycle of idea and action,*
*Endless invention, endless experiment,*
*Brings knowledge of motion, but not of stillness;*
*Knowledge of speech, but not of silence;*
*Knowledge of words, and ignorance of the Word.*

*Where is the Life we have lost to living?*
*Where is the wisdom we have lost in knowledge?*
*Where is the knowledge we have lost in information?*
*The cycles of Heaven in twenty centuries*
*Bring us farther from God and nearer to the Dust.*

T.S. Eliot, *Choruses from "The Rock"*

# Scientific Contributions to Meaning and Purpose in the Universe

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*Scientific developments over the past 75 years in physics and cosmology have brought staggering changes and, for many, placed man at the end of an enormous sweep of cosmological and evolutionary history. The Newtonian view of a mechanistic universe based upon cause and effect was first modified by Einstein's theory of special relativity which equated energy and matter and united space and time as an inseparable parameter, space-time. The latter's theory of general relativity replaced Newton's concept of gravitation with a mathematical expression which involved a distortion of space-time. Finally, quantum theory, with its new view of the atom and of the behavior of elementary particles, brought inherent uncertainty into all microcosmic events, and spelled the end of causation in physics.*

*The quantum world is seen to provide tremendous opportunity for the operation of transcendent Reality. In the area of evolution, the interaction of more deterministic mechanisms, with only the apparently random processes of mutation and selection, provides the means to realize the full potentialities which the Creator has designed for His cosmos.*

## A Common Current Scientific World View

The past few decades have witnessed scientific developments which far exceed anything our imaginations could contrive. Progress in particle physics, in cosmology, brain physiology and molecular biology have combined to give us a view of a universe of staggering size and intricacy. Physicist John Polkinghorne, in his recent book *The Way the World Is*, sums up with marvelous succinctness, a common current understanding of cosmology:

> In the beginning was the big bang. The earliest moment in the history of the world that science can conceive is when the universe was concentrated into a single point. As matter expanded from this initial singularity it cooled and successive regimes decoupled from thermal equilibrium. Thus after about three minutes the temperature had dropped to a thousand million degrees. That was cool enough for deuterium to form. The arrival on the scene of this stable composite of a proton and a neutron helped to fix the global balance of hydrogen and helium in the universe for the rest of its evolution. The ratio of three to one then established is what we still observe today. After that, nothing of great significance happened for several hundred thousand years. By then the temperature had fallen sufficiently for atoms to be able to form, and this had the consequence of decoupling radiation from thermal equilibrium with the rest of the universe. That same radiation, in a form cooled by further expansion, is observable today as the universal 3°K background radiation discovered by Penzias and Wilson in 1965, a re-echoing whisper from those faroff times some fifteen thousand million years or so ago.

> The universe continued to expand. Gravity took over and condensed matter into galaxies and the stars that compose them. In the nuclear cookery within those stars new heavy elements formed, such as carbon and iron, which had not occurred before. Dying stars, in supernova explosions, scattered these new elements into the environment. When second generation stars were formed by recondensation, their planets could be made of materials which permitted the next big development in the universe's evolution.
>
> On at least one planet, and perhaps on millions, conditions of temperature, chemical environment, radiation, and the chance congregation of simple atoms, permitted the coming into being of quite elaborate molecules with the power of replicating themselves in that environment. In a remarkable interplay of contingent chance (to get things going) and lawful necessity (to keep them going) there had begun a process by which systems of ever-increasing complexity would evolve. On our planet this eventually led to you and me.[1]

Even though we have painted our origin with a very broad brush, recall that the cosmological parameters within which these vast transitions occur appear to be necessarily of very precise magnitude. Physicist Paul Davies in his recent book, *Superforce*,[2] reminds us that the existence of complex stuctures in the universe seems to depend very sensitively on the numerical values of such fundamental constants as the speed of light, the masses of the various subatomic particles, and the forces acting between these particles. These numerical values determine many of the gross features of the world: the size of atoms, nuclei, planets, stars, and even living things.

Many of the complex structures in the universe are the result of a competition or balance between competing forces. Stars, for example, are a complexity of interplay between gravity, electromagnetic repulsion and nuclear forces. Gravity tries to crush the stars. Electromagnetic energy resists compression by providing an internal pressure. The energy involved is released from nuclear interactions precisely as legislated by the weak and strong forces characteristic of those particles. The nature of stellar complexity therefore delicately depends on the strengths of the forces, or the numerical values of the fundamental constants. Calculations show that changes in the strength of either gravity or electromagnetism by only one part in $10^{40}$ would spell catastrophe for stars like the sun.

When we come to the question of life's origin, the constraints would appear to be very great for life of any kind to have originated. Davies comments on this aspect:

> It is sometimes objected that if the laws of physics were different, that would only mean that the structure would be different, and that while life as we know it might be impossible, some other form of life could well emerge. However, no attempt has been made to demonstrate that complex structures in general are an inevitable, or even probable, product of physical laws, and all the evidence so far indicates that many complex structures depend most delicately on the existing form of these laws. It is tempting to believe, therefore, that a complex universe will emerge only if the laws of physics are very close to what they are.[3]

Perhaps the most complex structure to emerge in the universe is man himself. Whether or not we can afford to think of human beings as this unique, we must at least recognize that the level of complexity of the human brain is incredible. Recall anatomist Gareth Jones' estimate that the cerebral cortex contains $10^{10}$–$10^{14}$ nerve cells, and that each cell contacts more than 5,000 other nerve cells in quite precise arrangement.[4] The number of connections within one human brain rivals the number of stars in the universe!

Indeed, with the understanding that we may be the end-product of this vast cosmological process, comes a keen desire to not only understand the details of the physical universe's evolution but also to understand the nature of ourselves as persons. What is the meaning of a universe in which the primeval assembly of fundamental particles eventually manifests thc potential for organization into complex forms which are conscious and self-conscious, and which thereby transcend that matter from which they were derived? Science thus paradoxically seems to lead us, in our seach for intelligibility and meaning, beyond the realm of discourse of science alone.

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## Modern Physics Reveals an External Transcendent Reality.

One of the most fascinating things about the cosmos, as we know it, is its comprehensibility. It is susceptible to mathematical description in a way which seems to exclude the possibility of that description being simply a product of our own imagination. Polkinghorne also speaks of this scientific intelligibility of the world as follows:

> Again and again in physical science we find that it is the abstract structures of pure mathematics which provide the clue to understanding the world. It is a recognized technique in fundamental physics to seek theories which have an elegant and economical (you can say beautiful) mathematical form, in the expectation that they will prove the ones realized in nature. General relativity, the modern theory of gravitation, was invented by Einstein in just the same way. Now mathematics is the free creation of the human mind, and it is surely a surprising and significant thing that a discipline apparently so unearthed should provide the key with which to turn the lock of the world.
>
> It is this fact of intelligibility which convinces one that science is investigating the way things are. Its insights are certainly open to correction. As access is gained to new regimes, profound modifications can be called for. Thirty years ago, when I was a young research student, no one had dreamed of quarks and gluons. Who can feel confident that thirty years hence they will still be seen as the ultimate constituents of matter? Nevertheless the coherence of the inquiry into the structure of matter, the beautiful way in which the properties of previously "elementary" objects like protons and neutrons find a natural explanation in terms of their new constituents, makes one feel that it is a tale of a tightening grip on an actual reality.[5]

This reality has undergone tremendous changes in the past century. From the time of Newton and even Galileo, there had been a growing conviction among scientists that reality consisted of the description of phenomena in mechanistic terms. Isaac Newton's explanation of gravitation enabled the precise calculation of the motions of the planets; the kinetic theory of gases demonstrated that atoms, too, behaved like tiny billiard balls whose pressure-volume relationships were precisely accounted for by the methods of statistical mechanics. By the end of the 19th century, scientists were so bold as to state that all the important basic discoveries in physics had been made. Yet within the space of just a few years there occurred the discoveries of radioactivity, X-rays, the photoelectric effect, and the publication of two momentous new theories—

*Whether or not we can afford to think of human beings as unique, we must at least recognize that the level of complexity of the human brain is incredible.*

quantum theory and special relativity. Less than two decades later, the wave nature of the electron was demonstrated. All of physical science's major concepts were brought into question, especially those which depended upon the principle of causality. (This principle stated that if one knows the precise mechanical relationships between components before an event takes place, the outcome of that event can then be predicted with absolute certainty.)

William Pollard tells us in his recent paper "Rumors of Transcendence in Physics," that the first major confrontation of so-called natural causation was made by Ludwig Boltzmann, who applied the mathematics of games of chance developed for casinos to natural physical systems. Pollard explains:

> When probability is introduced anywhere in science, it means that two or more alternative responses to one and the same natural cause can be made by the system under study. Which alternative will be chosen by the system in any given instance is beyond the scope of science to specify. The most it can do is assign probabilities to the various alternatives. As between the alternatives, science has specifically renounced natural causation. When first introduced into science by Boltzmann, this idea

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was anathema to the great majority of physicists of his day and was vigorously contested. During the following three decades, however, its applications in the kinetic theory of gases, thermodynamics, and statistical mechanics convinced physicists of its validity, and Born's interpretation of quantum mechanics in terms of probability have made it a pillar of physics.[6]

Another massive shift in physical thinking was elicited by the brilliant work of Albert Einstein. Einstein's theory of special relativity was introduced as one of three papers he had published in an extraordinary three month period in the year 1905. Jaki[7] tells us that any one of the three would have established Einstein's fame: the first concerned light as consisting of quanta of energy, the second implicated particles of atomic size in Brownian motion, and the third, on the electrodynamics of moving bodies, later became known as the Special Theory of Relativity.

*Perhaps the simplest way to summarize these various effects is to say that they blur the distinction between space and time such that they may no longer be regarded as separate entities but rather as a single whole—space-time.*

What special relativity proposed was that matter and energy were equivalent, related by the expression $E = mc^2$, where E is energy, m is the quality of inertia associated with matter, and c is the speed of light in a vacuum. Its starting point was the observed fact that the speed of light (in a vacuum) is the same for all observers no matter how they may be moving. The implications of this, in addition to the equating of mass and energy, are that nothing can be accelerated to a speed greater than that of light, and that the mass of anything increases as it approaches the velocity of light. The most startling discovery is that two events which occur at the same instant for one observer may not be simultaneous for another observer, if the two are moving rapidly relative to each other. Perhaps the simplest way to summarize these various effects is to say that they blur the distinction between space and time in such a way that they may no longer be regarded as separate entities, but rather as a single whole—space-time.

It is most striking that Einstein was a humble man who was fascinated with the universe and its Maker. In this sense he was deeply religious—profoundly moved by the mysteries of the universe which even his great mind could scarcely comprehend. Lincoln Barnet, in his *The Universe and Dr. Einstein*, quotes Einstein:

> "The most beautiful and most profound emotion we can experience is the sensation of the mystical. It is the sower of all true science. He to whom this emotion is a stranger, who can no longer wonder and stand rapt in awe, is as good as dead. To know that what is impenetrable to us really exists, manifesting itself as the highest wisdom and the most radiant beauty which our dull faculties can comprehend only in their most primitive forms—this knowledge, this feeling is at the center of true religiousness."
>
> And on another occasion he declared, "The cosmic religious experience is the strongest and noblest mainspring of scientific research."[8]

Einstein also had a deep sense of the rationality of nature which was also strongly coupled to a belief in the freedom of thought and conceptualization. As Ian Paul describes it in *Science, Theology and Einstein*:

> According to Einstein, scientific theories have something in common with the images of the poet. Both stimulate the intuition of the individual as resources for the apprehension of reality. Basically, any scientific theory embodies aspects of reality that are not explainable in terms of that theory. Scientific theories are not comprehensive instruction manuals. They survey empirical knowledge but necessarily with limited logic and precision. Scientific research is always returning from abroad with intimations of new continents, their differing phenomena, and the novelty of their diverse life-forms. Einstein's notion of a concept presupposes the rationality of the universe, without which it would have no vital future. On this presupposition rests the fundamental faith from which all scientific hope springs.[9]

Einstein, in the succeeding decade, postulated (in his theory of General Relativity) that the notion of gravitation in the Newtonian sense could be replaced by a mathematical representation which involved a distortion of space-time. The existence of "curved space-time" opens up the possibility for a finite yet boundless universe shaped like a ball. Its surface would have no boundary, but because of the nature of curved space it would also have no center. This concept has subsequently opened up the entire field of cosmology and had led to our present understanding of the origin of the universe in the "big bang."

## Quantum Mechanics Ends Determinism in Physics

Polkinghorne, in *The Quantum World*,[10] tells us that there were two great discoveries in physics in the twentieth century—special relativity and quantum mechanics. Of the two, the more revolutionary was quantum mechanics, for it signaled the end of classical physics. Max Planck laid the foundation for quantum theory, when he showed that the emission and absorption of radiant energy takes place in a discontinuous manner involving discrete packets, which he called "quanta." The energy associated with each quantum

was related to the frequency of oscillation of the particular electromagnetic radiation by the expression $E = h\nu$ where h is the celebrated Planck's constant.

*"Scientific theories are not comprehensive instruction manuals. They survey empirical knowledge but necessarily with limited logic and precision."*

It was a study of Einstein's that provided one of the next important evidences of the "quantized" nature of radiation at the level of subatomic particles. Using Planck's quantum of action, he demonstrated that the photoelectric effect, the phenomenon in which electrons were ejected from certain metals by an incident beam of light, was dependent on a critical frequency. The light was behaving like a stream of electrons, bombarding the metal surface, but it was not the intensity of the electron beam *per se*, but rather its frequency of oscillation which determined the release of electrons. It was as though the electrons in the metal surface were like buoys anchored in a harbor. The force of the waves was somehow not the critical question in determining the breaking of the mooring lines, but rather the frequency of the waves. Below a certain frequency, no lines were cut regardless of the force of the waves. The concept of light energy as made up of individual particles, or "photons," colliding with electrons in the metal surface, was an entirely new idea. Thus, light was seen as having both wave and particle character, so physicists had to be content with the conclusion that the two models were complementary, each signifying some aspects of the real description of light energy.

But there were more difficult problems for physics. It was known from the work of J.J. Thomson that there were negatively charged particles called "electrons" in atoms, and it was supposed that the compensating positive charge was spread out, as Polkinghorne described it, "like the cakey part of a plum pudding, with the electrons embedded in it like currants."[11] However, in 1911, Lord Rutherford demonstrated that the positive charge of the atom was instead concentrated in a point-like object at the center of the atom—the nucleus. It was a great discovery, but it was entirely baffling for classical physics. The problem was that a planetary system of electrons rotating around a central nucleus would be unstable, since no known source could replace the loss of energy during rotation.

The beginning of a solution was provided by the Danish physicist Niels Bohr, who postulated that there were only certain orbits which allowed for planetary electron occupation, and that these were defined by Planck's constant h. It was noted that **h** was measured in the same units as those of angular momentum, a dynamic quantity which measures the amount of rotatory motion in a system, If angular momentum was "quantized," or restricted to specific quantum states, then the calculations of the energy associated with each orbit fit the equations of electromagnetic radiation perfectly.

However, subsequent developments placed stringent restrictions on the Bohr model, owing to the existence of what German physicist Werner Heisenberg called the "uncertainty principle." Here again Planck's constant came into the picture. Heisenberg showed that there was a quantitative relationship between the position and momentum of particles of atomic dimensions, such that the product of the uncertainties in the values of these two quantities was at least of the order of magnitude of Planck's constant. This meant that Bohr's electron orbits could at best be visualized only as clouds, designating a range of possible paths, and never as discrete paths in which position and momentum would have to be simultaneously known.

Here was the end of classical physics and rigid determinism, for it was no longer possible to precisely specify the initial and final states of any process at the level of elementary particles. The philosophical significance of this situation was devastating to many scientists but especially to Einstein. In Polkinghorne's words:

> But the man who reacted most violently, and was never fully reconciled to this aspect of the theory, was one of its intellectual grandfathers, the great Albert Einstein, whose explanation of the photoelectric effect had been a key step in establishing the existence of the photon. In 1924 Einstein had said that if the ideas, then in the air, of renouncing strict causality proved to be correct he would "rather be a cobbler, or even an employee in a gambling house, than a physicist." Later, in a letter to Max Born, he delivered himself of his celebrated remark that he did not believe that God (whom he customarily referred to in comradely terms as "the Old One") played at dice.[12]

The specific rebuttals to quantum mechanical uncertainty have taken several forms. One group claims that the flaw is in the observer's knowledge of an event. The danger here is that if we give up the reality of objective truth, originating outside ourselves, we give up science. A second group, including the Copenhagen school, suggests that the unpredictability is eliminated at the level of the classical measuring instruments of

a physicist, and we therefore arrive at true knowledge. The concern for this possible solution is that the world of the quantum is then falsely separated from the world of the measuring instrument, yet they are depended upon to interact in some meaningful way which should be susceptible to our explanation. The third effort at explanation of uncertainty revolves around the idea that conscious observers, rather than their measuring machines, have a special effect upon what is perceived at the microscopic level. This is different from the proposal of the first group, who simply disqualify objective knowledge. Here, the external world is taken quite seriously, as the origin of the chain of related events. But consciousness, as the essential factor in the transition from microscopic uncertainty to macroscopic order, is so highly anthropocentric that it raises problems of understanding physical processes prior to the advent of conscious observers. Recall the old limerick:

> There once was a man who said "God
> Must think it exceedingly odd
> If he finds that this tree
> Continues to be
> When there's no one about in the Quad."

There is one more approach to resolving quantum mechanical uncertainty, and this is the "many-worlds interpretation" proposed by Hugh Everett in 1957. His proposal was that where various choices are involved in the experiment, each possibility is realized but each occurs in a separate world, only one of which is that of the present observer. However, each world would presumably have a clone of the objects and observers, each entirely unaware of the others. The biggest problem with this approach to explanation is that it multiplies entities to profusion, in violation of the principle of simplest interpretation, which we owe to William of Occam.

The world of quantum mechanics has opened up vast new vistas—scientifically, philosophically, theologically. Science, as a tightly closed, self-sufficient system is gone. The possibilities for question and explanation are almost limitless.

## Processes Depend Upon the Interplay of Chance and Necessity

The vast sweep of processes leading to intelligent life which were briefly described at the beginning of this article—the fine structure of their interactions, the explanation for their direction and their remarkable result—seem best understood in terms of some very special type of interplay between chance and necessity. As Polkinghorne expresses it:

> The processes of the world seem to depend for their fruitfulness upon an interplay between chance and necessity. A random event (an aggregation of atoms, a genetic mutation) produces a new possibility which is then given a perpetuating stability by the regularity of the laws of nature. Without contingent chance, new things would not happen. Without lawful necessity to preserve them in an environment whose reliability permits competitive selection, they would vanish away as soon as they were made. The universe is full of the clatter of monkeys playing with typewriters, but once they have hit on the first line of Hamlet it seems that they are marvellously constrained to continue to the end of at least some sort of play.

*"In 1924 Einstein had said that if the ideas, then in the air, of renouncing strict causality proved to be correct he would 'rather be a cobbler, or even an employee in a gambling house, than a physicist.'"*

> To many, this apparent role of chance is a sign of the emptiness and pointlessness of the world. In his book *Chance and Necessity* Jacques Monod wrote, "pure chance, absolutely free but blind, [is] at the very root of the stupendous edifice of evolution," and he concluded his book by writing: "the ancient covenant is in pieces; man at last knows that he is alone in the unfeeling vastness of the universe, out of which he emerged by chance. Neither his destiny not his duty have been written down."
>
> When I read Monod's book I was greatly excited by the scientific picture it presented of how life came to be. As a particle physicist, I found the biochemical details pretty difficult to follow but, assuming them to be correct, they implied that Schrodinger's equation and Maxwell's equations (the fundamental dynamical equations of quantum theory and electromagnetism respectively, which I could literally write down on the back of an envelope) had this astonishing consequence of the emergence of replicating molecules and eventually life. The economy and profundity of that is breathtaking. For me, the beauty that it revealed in the structure of the world was like a rehabilitation of the argument from design—not as a knock-down argument for the existence of God (there are no such arguments; nor are there for his non-existence) but as an insight into the way the world is.[13]

There have been many other rebuttals to Monod's atheistic conclusions. Arthur Peacocke responds as follows:

> I see no reason why this randomness of molecular event in relation to biological consequence, that Monod rightly emphasizes, has to be raised to the level of a metaphysical principle interpreting the universe. . . . In the behavior of matter on a larger scale many regularities, which have been raised to the level of being describable as "laws," arise from the combined effect of random microscopic events which constitute the macroscopic. So the involvement of chance at the level of mutations does not, of itself, preclude these events manifesting a law-like behavior at the level of populations of organisms and indeed of populations of bio-systems that may be presumed to exist on the many planets

throughout the universe which might support life. Instead of being daunted by the role of chance in genetic mutations as being the manifestation of irrationality in the universe, it would be more consistent with the observations to assert that the full gamut of the potentialities of living matter could be explored only through the agency of the rapid and frequent randomization which is possible at the molecular level of the DNA. In other words, the designation "chance" in this context refers to the multiple effects whereby the (very large) number of mutations are elicited that constitute the "noise" which, via an independent causal chain, the environment then selects for viability. This role of chance is what one would expect if the universe were so constituted as to be able to explore all the potential forms of organizations of matter (both living and non-living) which it contains. Moreover, even if the present biological world *is* only one out of an already large number of possibilities, it must be the case that the potentiality of forming such a world is present in the fundamental constitution of matter as it exists in our universe. The original primeval cloud of fundamental particles must have had the potentiality of being able to develop into the complex molecular forms we call modern biological life. . . . I see no reason why God should not allow the potentialities of his universe to be developed in all their ramifications through the operation of random events; indeed, in principle, this is the only way in which all potentialities might eventually, given enough time and space, be actualized.[14]

*Science, as a tightly closed, self-sufficient system is gone. The possibilities for question and explanation are almost limitless.*

But there is here a certain detachment of God from His creation, which somehow seems inconsistent with the biblical notions of providence and chance. William Pollard, in his *Chance and Providence*,[15] seeks to retain an immanent Creator in the seemingly random processes themselves. To Einstein's famous question, "Does God throw dice?" he says the Judeo-Christian answer is not, as many have wrongly supposed, a denial, but a very positive affirmative. For Pollard, God is working intimately in the complexity of relationships which he describes as a maze, a fabric of turning points, open at every step to new choices and new direction. Here, God is not altering the natural probabilities, but rather selecting from all the alternatives at each turning point.

## Evolution as Interplay of Chance and Necessity

Of the many and varied ancient ideas of the world, all had certain things in common: their typical constricted dimensions, mechanistic structure and static character. Even in the Ptolemaic picture of things, which continued in vogue for more than a thousand years, the earth was seen as a globe encompassed by huge crystalline spheres representing the rest of the universe. Ancient men had no idea of the universe's gigantic proportions. The ancient world was also seen as a combination of heterogeneous elements that were in some way "put together" extraneously and had only a mechanical link with one another. A view of this sort made no proper allowance for the reciprocal cohesion of all entities. Just as a machine is made up from a number of previously prepared components, so men imagined the world to be a huge mechanism in which a variety of preconstituted and mutally independent entities had been artificially conjoined.

The earth, the vault of heaven, the plants, animals and man were thus envisaged as so many diverse "creatures," subsisting independently of each other, as it were, and only made up into a whole rather like, for example, the pieces of furniture in a living room. In a modern world picture there is a complete reversal of these conditions. Science has gradually made it more and more clear that all entities are continuously and intrinsically interconnected, so that we may now see the world as a mighty, organic whole in which everything is related to everything else. The world in which we live may be seen, not as a machine, artificially contrived, but perhaps even as an organism being built up from within—an organism in which all entities have appeared through something like a stage-by-stage process of growth.

Finally, the old world-picture stood for the firm belief that the universe is to be conceived of as a fundamentally changeless and static whole. Of course, men were not blind to the mutations and motions occurring in the world; but as they saw it, these changes were always on the surface of things and did not affect their essential nature. From its moment of origin, everything assumed a form and aspect that was definitive and unchanging, and these forms were constant and unalterable. The machine worked, it was activated, but the machine itself never altered. Along with the mechanistic view of the world, our conception of it as static has also disintegrated; for nowadays we see the universe as an enormous historical process, an evolutive happening which has been going on for thousands of millions of years and is moving on into an incalculable future.

The concept of chance, of a probabilistic way of looking at events and processes, came on the scientific scene at about the same time as Charles Darwin's theory of organic evolution. It entered the static, mechanistic world of Isaac Newton, a world of cause and effect, and brought about a profound change—scientifically, philosophically, theologically—in the way we perceive the world. C.H. Waddington in his *The Nature of Life*[16] tells us that the idea of evolution

was not entirely new, having been anticipated by the ancient Greeks, and appreciated even by St. Augustine and by St. Thomas Aquinas in the Middle Ages. But what Darwin brought with his theory of organic evolution was the novel idea of the production of new genotypes, of recombination and fertilization, as essentially random, chance events. The subsequent impact of Darwin's theory, and especially the notion of chance, on theological thinking is described by Waddington:

> This emphasis on the importance of chance has been one of the most profound and far-reaching of Darwin's influences on human thought. It spread into fields far removed from those which Darwin discussed. As we all know, during this century there has been a strong tendency to frame the laws of physics in terms of probability or chance events, rather than in terms of the type of simple causation which had been relied on by Newton.
>
> Within the field of evolution the rival type of hypothesis, which the reliance on chance superseded, was one which depended on the operations of an intelligent designer. Darwin himself, to some extent at least, shared the feelings of many of his contemporaries, that the substitution of chance for design as an explanatory principle tended to undermine one of the major intellectual reasons for a belief in God. "I may say," he wrote in one of his letters, "that the impossibility of conceiving that this grand and wonderous [sic.] universe, with our conscious selves, arose through chance, seems to me the chief argument for the existence of God; but whether this is an argument of real value, I have never been able to decide. . . . The safest conclusion seems to be that the whole subject is beyond the scope of man's intellect . . . "
>
> Many of his readers, particularly those who were not scientists, could not bring themselves to adopt such a neutral attitude, and felt deeply shocked. As Irvine has put it, "Darwin's explanation of evolution is mechanistic without the favourable implications of mechanical design. Natural selection represents not a harmony but a conflict, and is effected not by the precise, mathematical idealism of invisible force, but apparently by a crude, random sorting out of variations by the environment. . . . Many who were willing to believe in an evolving Deity could not believe in one who dealt in random variations. They could accept an evolving universe but not a universe shaken out of a dice box."[17]

We have already addressed the way in which random chance events may be perceived as the Creator's activity, but we should also consider the fact that there is another meaning for the word "chance" which lends further insight into the way we may see God's hand in the interplay of chance and necessity. Donald MacKay, in *Clockwork Image*,[18] distinguishes two kinds of chance. In the scientific sense, chance is often used as a technical term indicating the absence of the knowledge of causal connections between events. However, in popular usage, chance signified this metaphysical notion which Darwin saw as an alternative to God.

MacKay points out that during nineteenth century debates on the role of "chance" in biology, the two uses of the word became confused. Science seemed to be making unjustifiable metaphysical assertions, while the Bible got the reputation of denying the validity of the purely technical, and theologically neutral, scientific notion of chance. As usual, the Bible itself has clues that ought to have warned us against this. Chance is mentioned in the sense of chaos in Genesis 1:2, where the earth is described as "without form and void," but here it is only as something banished from the world by God's creative word. Chance in the neutral scientific sense however, is mentioned as a part of God's plan. "The lot is cast into the lap," says the book of Proverbs (16:33), "but the decision is wholly from the Lord." Here is a clear indication that God is the Lord of events which in this sense "happen by chance," just as much as of those that seem orderly to us. It may be easier for us to see God's hand in the obviously orderly pattern, but the Bible seems to exclude the idea that He *must* always work in this way. The "either–or" (either God *or* chance) is simply not the way the Bible relates the two, if we take "chance" in the first, technical, sense.

*Science has gradually made it more and more clear that all entities are continuously and intrinsically interconnected, so that we may now see the world as a mighty, organic whole in which everything is related to everything else.*

Clearly, from what has gone before, there is also the occasional use of the term "chance" in its "random" sense, as though it were a scientific term. But even here, there have been concerns expressed that the random component is over-emphasized, since there appear to be ordering and structuring forces involved in the evolutionary mechanism in close proximity to the initiating events in mutation.

For example, Gordon Taylor, in *The Great Evolution Mystery*,[19] discusses the possibility of an inherent self-stabilization of the genome as an important selective factor in evolution. He mentions L.L. Whyte's proposal, in *Internal Factors in Evolution*, that the genome is self-stabilizing; it will only accept mutations which increase or at least are neutral with respect to its stability. In other words, only those mutations which satisfied certain stringent physical, chemical and functional conditions would survive the complex chromosomal, nuclear and cellular activites involved in the

processes of cell division, growth and function. The number of possible variations is seen as limited. Perhaps the genome can modify nearly acceptable mutations.

*It may be easier for us to see God's hand in the obviously orderly pattern; but the Bible seems to exclude the idea that he* must *always work in this way.*

Probably it can handle groups of mutations, each of which alone might be unacceptable, if the overall effect is stabilizing. Taylor points out that if Whyte is right, no mutation is entirely due to chance: only those which meet the internal demands of the genome can be utilized in evolutionary processes.

Equally intriguing is the existence of so-called "dissipative structures," a class of steady-state systems which occur in certain far-from-equilibrium situations, which are implicated by Nobel laureate Ilya Prigogine in the ordering process in evolution. It may be granted that the increase in order and complexity in the evolution of living things is explainable thermodynamically—occurring at the expense of the free energy of compounds, which are broken down for energy, and by the return of heat to the environment. But there remain serious questions as to the large changes which have occurred in the course of evolution, not only in the origin of the first cell-like structures, but also in numerous large jumps or "emergences" within the subsequent evolutionary sequence. Non-equilibrium thermodynamics seems to be a likely agency in these bold transitions. Arthur Peacocke addresses this development as follows:

> We know that, in systems near to equilibrium, any fluctuation away from that state will be damped down and the system will tend to revert to its equilibrium state. What Prigogine and his colleagues have been able to show is that there exists a class of steady-state systems, "dissipative structures," which by taking in matter and energy can maintain themselves in an ordered, steady state far from equilibrium. In such states there can occur, under the right conditions, fluctuations which are no longer damped and which are amplified so that the system changes its whole structure to a new ordered state in which it can again become steady and imbibe energy and matter from the outside and maintain its new structured form. This instability of dissipative structures has been studied by these workers who have set out more precisely the thermodynamic conditions for a dissipative structure to move from one state to a new state which is more ordered than previously. It turns out that these conditions are not so restrictive that no systems can ever possibly obey them. Indeed a very large number of systems, such as those of the first living forms of matter which must have involved complex networks of chemical reactions, are very likely to do so, since they are non-linear in the relationship between the forces and fluxes involved (which is one of the necessary conditions for these fluctuations to be amplified.)[20]

Manfred Eigen and his co-workers[21] have also addressed the problem of the origin of living systems, building on a now widely accepted hypothesis that the replicating macromolecules of the simple, pre-cellular systems underwent an evolution-like process. Synthesis occurred by interaction of smaller components to yield macromolecular structures by the ordinary physico-chemical laws of molecular interaction. However, once a group or family of these macromolecules had formed, a random selection process would search out from all the various structures that small number which had utility for the developing system—catalytic activity, stabilization, or whatever—and thereby generate a kind of "dominant species." The key to the success of the process is in the balance of deterministic and random events, the first insuring that useful macromolecular species will survive, the last providing the capacity for creative experimentation within existing structures. Here again the "random" component appears to be anything but blind. Instead, it appears peculiarly well situated to achieve a very purposeful end. The work of Prigogine, Eigen and their collaborators demonstrates the subtlety of the interplay of apparent randomness and determinism in the processes which appear to have led to the emergence of living things.

*What seems increasingly evident is that our enormous universe is nevertheless finite, intelligible, and purposeful.*

What seems increasingly evident is that our enormous universe is nevertheless finite, intelligible, and purposeful. At each successive level of its complexity, new potentialities are realized and new concepts and methods are applicable. To the extent that we can talk of random or chance events in the evolution of our cosmos, they seem remarkably constrained to yield some useful and often astonishing products.

All of this is perfectly consistent with the existence of a transcendent God of infinite wisdom who evidences intimate concern for His creatures, yet encourages the operation of free will in His creation. These are the

conclusions, too, of an increasing body of scientists in our day. Physicist Paul Davies, at the conclusion of his most recent book, *Superforce*, asks:

> Should we conclude that the universe is a product of design? The new physics and the new cosmology hold out a tantalizing promise: that we might be able to explain how all the physical structures in the universe have come to exist, automatically, as a result of natural processes. We should then no longer have need for a Creator in the traditional sense. Nevertheless, though science may explain the world, we still have to explain science. The laws which enable the universe to come into being spontaneously seem themselves to be the product of exceedingly ingenious design. If physics is the product of design, the universe must have a purpose, and the evidence of modern physics suggests strongly to me that the purpose includes us.[22]

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*I saw Eternity the other night,*
*Like a great ring of pure and endless light,*
*All calm, as it was bright,*
*And round beneath it, Time, in hours, days, years,*
*Driven by the spheres,*
*Like a vast shadow moved, in which the world*
*And all her train were hurled.*

Henry Vaughan

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*What notion should we have of the unchanging and unchangeable, without the solidity of matter? . . . How should we imagine what we may of God without the firmament over our heads, a visible sphere, yet a formless infinitude? What idea could we have of God without the sky?*

George MacDonald, *Unspoken Sermons*, third series, "The Truth".

# Christianity and E.O. Wilson's Mythology of Scientific Materialism

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*E.O. Wilson's sociobiology has significant religious implications which have been largely ignored by Evangelical Christians. Wilson seeks to replace traditional beliefs with the evolutionary myth of scientific materialism. He claims his myth assuages an archaic, innate need to believe. However, such a claim lacks adequate data and epistemological foundation, and is, in part, a personal attack upon Christian faith. Sociobiology freed of myth might complement the Christian understanding of human nature and society.*

Sociobiology had its official birth in 1975 with the publication by E.O. Wilson of his massive work *Sociobiology: The New Synthesis*. Through much of the dozen years of its existence, this young science and E.O. Wilson, its chief proponent, have been steeped in controversy. Some critics have charged that sociobiology is a new kind of racism and sexism. Others have feared a new eugenics or the "biologization" of the social sciences. These concerns, we think, have received adequate scientific as well as public attention.[1]

In spite of the visibility of sociobiology, Evangelical Christians seem to have largely ignored the potent religious implications of the new science.[2] This lack of attention is not due to an absence of accessible literature, for in addition to Wilson's technical works, he has authored for popular consumption a Pulitzer Prize-winning book *On Human Nature*[3] and co-authored with Charles Lumsden *Promethean Fire: Reflections on the Origin of Mind*.[4] More recently he has published *Biophilia*,[5] in part a sociobiology of environmentalism and in part an autobiographical sketch. In all three works, Wilson openly challenges Christian faith by offering a substitute belief system based upon scientific materialism. What should concern Evangelical Christians even more, however, is Wilson's claim that—for reasons intrinsic to current findings in sociobiology—he must *actively promote* the science as a new religion or mythology.[6]

To understand the reasons Wilson gives for wanting to promote scientific materialism as religion, we need first to examine some of the findings of sociobiology.

## What is Sociobiology?

Sociobiology studies the biological basis for social behavior in animals by incorporating elements of evolutionary theory, population genetics, ecology, and

ethology.[7] The new hybrid science takes on a problematic character when applied to human social behavior. Within humans, the wealth of cultural adaptation under the apparent guidance of a complex mind would seem to disengage human social behavior from genetic moorings. But according to Wilson and other sociobiologists, we have not totally escaped our genes. The human mind—far from being a *tabula rasa* or blank slate—does not transcend genetic influence. It is tied to a genetic leash in the form of the evolutionary history and process that built the mind.

Wilson argues that the mind can be accounted for entirely materialistically, the product of a fourth great stage in evolutionary history.[8] In *Promethean Fire*, Lumsden and Wilson provide one model (which they term "gene-culture coevolution") for how the mind could have come into being. This model hypothesizes that genes prescribe the rules of development, called epigenetic rules, by which the mind is assembled. The mind grows by interacting with and, perhaps, modifying existing culture. Some individuals possess epigenetic rules enabling better adaptation to the contemporary cultural environment. These more successful epigenetic rules and the genes which encode them tend to spread through the population by means of natural selection. The net result is that "culture is created and shaped by biological processes while the biological processes are simultaneously altered in response to cultural change."[9] Thus, they coevolve.

To track the mind's evolution, sociobiologists have begun to identify human behaviors that may have some genetic component, and to couple these behaviors with explanations of their evolutionary significance. Studies of infant behavior have yielded some clear examples of genetically influenced behavior: crying, smiling, nursing, startle response, and showing of anger are innate behaviors. Lumsden and Wilson point out that certain kinds of learning capacities also seem innate, those associated, for example, with language acquisition and with the ability to recognize certain patterns and colors.[10]

Sociobiologists find it more difficult to distinguish innate from culturally influenced behaviors in adults. It seems clear, for instance, that basic adult emotions and human gregariousness are genetically derived behaviors. But do adult traits like altruism, incest taboos, and sexual roles also belong on a list of genetically influenced behaviors? Can these traits be shown to have enhanced evolutionary fitness in human beings? As may be expected, for sociobiologists the answer to these questions is a resounding "yes."

## The Attack on Christianity

Wilson sees religion as a product of our genetic history. For him, belief in the supernatural is to some degree a built-in genetic predisposition or, in Wilson's own words, "an ineradicable part of human nature."[11] In his article, "The Relation of Science to Theology," he elaborates:

> Sociobiology has given religious exaltation a Darwinian function. It is the set of enabling devices by which the individual merges his will temporarily with that of the tribe, reaffirms the value of collectivity, and survives the rites of passage and stress of personal tragedy.[12]

Wilson's regard for the evolutionary value of religion places him, as a scientific materialist, in a peculiar position. For whereas Wilson thinks that religious belief has in the past conferred an adaptive advantage, he nevertheless views religious belief as empirically false. The ancient myths (including Biblical Christianity) continue to hold modern man even though they "offer nothing concrete about man's ultimate meaning."[13] The challenge, then, is to replace these now archaic behaviors or the epigenetic rules that produce them with more adaptive behaviors. This would involve either an unpopular genetic engineering project or a more palatable course of tricking the genes with a

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substitute belief system. Wilson opts for the latter short-term solution: scientists should channel to their own ends the innate propensity to believe.

> This mythopoeic drive [i.e., the tendency toward religious belief] can be harnessed to learning and the rational search for human progress if we finally concede that scientific materialism is itself a mythology defined in the noble sense.[14]

*Whereas Wilson thinks that religious belief has in the past conferred an adaptive advantage, he nevertheless views religious belief as empirically false.*

At the end of *On Human Nature*, Wilson confidently predicts the defeat of Biblical Christianity and other traditional religions by this noble scientific mythology:

> . . . make no mistake about the power of scientific materialism. It presents the human mind with an alternative mythology that until now has always, point for point in zones of conflict, defeated traditional religion.[15]

The new mythology, according to Wilson, will "explain traditional religion, its chief competitor, as a wholly material phenomenon."[16] Scientific materialism must triumph because "Man's destiny is to know, if only because societies with knowledge culturally dominate societies that lack it."[17]

If traditional religion and scientific materialism are competing mythologies, then scientists like Wilson must make their mythology and supporting "data" accessible to the skeptical public. Wilson consciously does so in his popular writings. In the Pulitzer Prize-winning *On Human Nature*, he reveals the form his mythology must take—the narrative form of an evolutionary epic. He goes on to say, "Every epic needs a hero: the mind will do."[18] Mind, or the brain which materially houses the mind, is his choice for a hero because it is the most complex device we know.

Wilson develops details of the evolutionary epic in the more recently published *Promethean Fire*. In this epic, Mind is a kind of modern hero that, by understanding the deep connections between culture and genes, can choose the best future for mankind; i.e., Mind may "now take control . . . "[19] As a result, humanity will no longer have to be held captive by the vagaries of conscience or God's will. Rather, society, impelled by faith in the new scientific mythology, will succeed in linking all knowledge into a "seamless whole" in which theory and verification run unbroken from physics, through chemistry and biology, to the social sciences. Within this knowledgeable existence the human mind may even be able to conceive how it, a mere biological device, can create purpose; and from purpose, meaning.[20]

In summary, sociobiology seeks to understand human social behavior, including religious behavior, biologically. In sociobiology, religion is an archaic biological need dictated by epigenetic rules emanating from our genes. If, as Wilson believes, religion does not provide a reliable view of the world, it follows that societies under the guidance of sociobiology should choose either to eliminate this archaic drive or to subvert it by a modern substitute mythology. Scientific materialism offers a substitute myth in the form of the evolutionary epic that, because of its ability to explain traditional religion as a genetic hallucination, will ultimately replace "conscience" and "God's will" with human knowledge. Man, having achieved this knowledgeable condition, will create his own purpose and meaning.

## A Christian Critique of Wilson's Mythology

Evangelicals can critique Wilson's myth by exposing how he employs his science-turned-religion to persuasive advantage. Wilson claims that he constructs his myth of scientific materialism in order to appeal to "the deepest needs of human nature . . . "[21]; however, his myth also enables him to bypass certain otherwise insolvable problems in his argument.

First of all, Wilson uses myth to lend a sense of urgency to the new science. In *Promethean Fire*, he frequently laments that there are few sociobiological studies yet completed. As a result, Wilson refers monotonously to a single study on incest taboo as a means of support for various points in his argument. But as Wilson spins his evolutionary epic containing colorful, if hypothetical, glimpses of evolving man's experiences, the rather sparse data begin to seem more acceptable. Even a fellow evolutionist, Stephen Gould, faults Wilson's sociobiology for lack of evidence. Gould says of *On Human Nature*: "The chapters are full of insight, but they do not buttress genetic claims." Instead, they draw upon a "speculative tradition . . . the just-so story."[22]

A second advantage which Wilson gains through writing his myth of scientific materialism is that he is able to bypass an epistemological weakness inherent in sociobiological theory. This weakness dates back to Darwin, who reported having a

> horrid doubt . . . whether the convictions of man's mind which has been developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust in the convictions of a monkey's mind, if there are any convictions in such a mind?[23]

Can such a mind reliably know even that it evolved in the way Darwin—or Wilson—believe it did? As Ray Bohlin observed:

> how can the brain, which [Wilson] says is a construct of evolutionary processes functioning only to promote survival, be expected to recognize truth? . . . The brain should be expected only to perceive the world around it in such a way as to further the survival of the species. Whether or not [the] perception is true is totally irrelevant from the evolutionary vantage point.[24]

Wilson responds to this serious epistemological problem by suggesting we do not need truth in an absolute sense. Mythic truth is all we can have or need to have. To quote Wilson:

> What I am suggesting, in the end, is that the evolutionary epic is probably the best myth we will ever have. It can be adjusted until it comes as close to truth *as the human mind is constructed to judge the truth.*[25] [emphasis ours]

Thus, Wilson dismisses the epistemological uncertainty in sociobiology by an appeal to the supposed sufficiency of mythic truth.

Do we, as Evangelical Christians, need to settle for mythic truth? Biblical revelation should not be viewed as merely one of several competing myths. Rather, it is the vehicle by which God has delivered us from epistemological uncertainty. For, as the late Francis Schaeffer pointed out, God has spoken to us from His infinite point of view; we thereby have a basis for knowing with certainty truths external to the human mind.[26]

Myth gives Wilson a third advantage, namely a format through which he can attack competing beliefs. In his article "The Relation of Science to Theology," he is explicit about his antagonism toward "fundamental religion, which in its aggressive form is one of the unmitigated evils of the world [and which] cannot be quickly replaced by benign skepticism and a purely humanistic worldview."[27] Since Wilson claims to have learned about "fundamental religion" from "bitter experience" and exhorts his readers to employ "liberal theology" as a "buffer" between science and fundamental "dogmatic religions," his remarks certainly include—and may primarily refer to—conservative Christianity.

In his works, Wilson implies that the epistemological foundations of dogmatic religions (i.e., conservative Christianity) will crumble as a result of future sociobiological studies. In *On Human Nature*, Wilson sees science as now facing "the possibility of explaining traditional religion by the mechanistic models of evolutionary biology. . . . If religion, including the dogmatic secular ideologies, can be systematically analyzed and explained as a product of the brain's evolution, its power as an external source of morality will be gone forever. . . ."[28] In a similar vein, he writes in *Promethean Fire*, "All domains of human life, including ethics, have a physical basis in the brain and are part of human biology; none is exempt from analysis in the mode of the natural sciences."[29] Elsewhere he claims, "philosophical dualism and transcendental ethical categories . . . have been rendered vulnerable to empirical analysis and await confirmation or disconfirmation by the instruments of scientific analysis."[30] By calling into question the existence of ethical norms and supernatural realities, Wilson attacks Christianity at the level of its most basic assumptions.

*In sociobiology, religion is an archaic biological need dictated by epigenetic rules emanating from our genes.*

However, as Wilson attempts to draw the limits of human knowledge short of anything but empirically derived naturalistic explanations, he eliminates grounds for establishing the truth of his own assertions about the nature of reality. For empirical evidence has *not* established what is to Wilson a " . . . plain but awesome fact that the brain is a machine created by genetic evolution."[31] Neither is there empirical evidence to warrant Wilson's belief that " . . . gene-culture coevolution, alone and unaided, has created man."[32] Neither is Wilson's statement, " . . . moral judgment is a physiological product of the brain,"[33] empirically derived. On what basis, then, does Wilson make such claims? By an appeal to myth, Wilson exhorts readers to *believe* in the power of the mind and of scientific materialism to produce experimental evidence for these *some time in the future*. Should readers question what business a scientist has promoting myth, Wilson's myth contains its own defense; after all, the reader's archaic biological need for religious belief has lured sociobiology to the task.

What if Wilson's hope is realized and sociobiology succeeds in demonstrating some genetic basis for religion? A discovery that religious behavior arose through a mechanism such as gene-culture coevolution in no way denies the activity of an objectively existing God. In fact, one normally understands natural selection as tracking or being constrained by something real in the

environment—climatic change, food supply, availability of water or home sites, *et cetera*. How could sociobiologists disprove that we are likewise genetically tracking God's actual presence and revelation to us? Should conclusive evidence for a genetic basis for religion appear, Christians might find their intellectual position strengthened rather than diminished.

When Wilson was asked whether human beings might be tracking a set of ethical precepts which actually exist "outside of the human mind and the idiosyncrasies of human evolution," he replied that he had no answer. His mythology of scientific materialism is, as he freely acknowledges, a matter of faith.

> As a scientific materialist . . . I prefer to go my own materialistic route of assuming, as a working hypothesis, that we will eventually explain all of ethical behavior and ethical precepts as the outcome of genetic evolutionary processes; but I certainly respect and am greatly bemused by the alternative explanation. . . .[34]

We have seen that Wilson employs his mythology of scientific materialism to persuasive advantage. He bypasses problems of sketchy evidence for his assertions and an inadequate epistemology by appeal to a myth he claims is destined to triumph over traditional religions. It is noteworthy that Marx's materialistic religion likewise predicted its own eventual triumph. Wilson's myth of scientific materialism may have a similarly powerful appeal. Christians should take more seriously the potentially religious character of sociobiology.

## Contribution of Sociobiology to a Christian World View?

The religious form Wilson has given sociobiology unfortunately makes the science of sociobiology seem inaccessible and even irrelevant to Christian thought and practice. However, as data accumulate to bolster the basic theses of sociobiology, that human behavior has a genetic leash[35] and that genes and culture can interact with each other in profound ways[36], the impact on Christian faith may be positive rather than negative.[37] There are several areas in which confluences may exist between Wilson's sociobiology and our Christian faith. In this section we will consider some propositions that both sociobiology and the Biblical view of man seem to share.

### 1. *Natural man's goodness is corrupted.*

According to Wilson's *On Human Nature*, sociobiology has built a case that altruism is not only genetically influenced but is, at its core, a selfish gene-preserving activity. Wilson views human altruism as more subtle and flexible than the hard altruism of ants and bees. Social insects will sacrifice their lives, but only for those they recognize as being biologically related to them. Presumably, the sacrifice is otherwise not genetically profitable. According to Ruse and Wilson, human altruistic behavior depends upon: 1.) how closely the recipient is related to oneself, and 2.) how likely one's altruism will be reciprocated in the future (so that one's genes are preserved either directly or through one's children). To be sure, we do not calculate genetic return consciously. Rather, Ruse and Wilson argue that our epigenetic rules governing mental development serve as a foundation for moral altruism, predisposing us to feel as if certain courses of action are "right."[38] One recent report seems to support the concept of there being a genetic basis for altruism in humans.[39] This study of twins measured a heritability of altruism as high as 50%. If, as it appears, moral altruism has a biological core, it cannot violate the genes. We are inclined to behave altruistically because "it is in our biological interests to cooperate."[40]

In the New Testament, Jesus seems to call us to practice an altruism unfettered by biological necessity. We are asked to help those who are least able to pay us back and to take on the role of the servant. To make such indiscriminate altruism possible, Jesus promises us eternal rewards. Anything less than this indiscriminate altruism falls short of God's glory and has, at best, only an earthly reward (Matthew 6:1–4). Since we are unable to live according to this standard, we require a new nature.[41]

*Should conclusive evidence for a genetic basis for religion appear, Christians might find their intellectual position strengthened rather than diminished.*

### 2. *There may be a genetic predisposition toward sin.*

Sociobiology seems to indicate that each of us carries temptations toward certain sins as a result of the particular epigenetic rules we inherit. Do recent studies tend to confirm this contention? Adoption studies demonstrate that crime and delinquency have a significant genetic component.[42] Twin studies have measured the heritability of aggressiveness at well over 50%.[43] Likewise, a variety of social attitudes including those toward feelings of racial superiority, white lies, and divorce show a marked genetic component of transmission.[44] Apparently, particular temptations toward sin haunt each of us in varying degrees.

One sinful behavior for which *On Human Nature* rallies a persuasive case of genetic predisposition is homosexuality. Careful study of genetic bias has, to the best of our knowledge, not been done. And yet, interestingly, a recent study has reported a difference in hormonal response of homosexual males compared to that of heterosexual males.[45]

*We would like to speculate that this program of genetic manipulation has already been attempted, and that its unsuccessful outcome is recorded for us in the Biblical history of Israel.*

Our knowledge of genetic influence behind sinful behaviors of any kind may help us to realize anew that for one to conquer temptation requires more than a simple decision of the will. The struggle with sin requires God's grace and power.

**3.** ***A bizarre duality exists in human nature.***

On the one hand, sociobiology exposes the self-seeking and sinful tendencies in human nature as observed above. On the other hand, Wilson says we seek after God. Although he interprets this universal hunger as a genetically induced hallucination, Christians can spot in sociobiology some evidence for innate knowledge of God's existence and claim on our lives (see Romans 1:19). Even though sociobiology as a form of scientific materialism is antagonistic to Christianity, the reality of human nature can be made plain under both systems.

**4.** ***Man is an ethical being.***

*On Human Nature* and *Biophilia* both suggest that we contain within us a universal set of cardinal values—a moral sense. It is too early to do more than speculate on how extensive and significant these values may be. Wilson suggests that there are three basic ethical values: preservation of the common human gene pool, maintenance of the diversity of that gene pool, and recognition of universal human rights.[46] From these cardinal values one may find a link to other basic ethical norms which find acceptance in a wide range of human cultures.[47] Sociobiology, then, seems not only to support the notion of humans as ethical beings but even to argue for there being a shared, nonrelativistic ethic. Having said that, we still must wonder how adequate this naturalistic ethic will prove to be, especially when compared to God's perfect ethic revealed through the life of Jesus. Remember, since sociobiology assumes a genetic link, any human institution or rule for behavior will be founded on "enlightened self-interest."[48]

**5.** ***Man is a part of nature and has a unique guardianship toward nature.***

Sociobiology is built upon the assumption that humans are biologically rooted in the natural world. To paraphrase Wilson: our humanness in good part derives from the way we affiliate with other organisms.[49] Scripture likewise strongly links us to the earth through a proximal origin from dust and from Adam. (In addition, though, we have an important link to the Creator in whose image we have been made.) Science and Scripture are also much concerned with man's stewardship of nature: Adam was told to till and to keep the garden; the Jews were commanded not to destroy trees under emergency conditions; even the command to have dominion (Genesis 1:28) implies a guardianship of nature. In *Biophilia*, Wilson seeks a basis for a modern environmental ethic—a "knowing stewardship." Although Wilson thinks the development of an environmental ethic is still in an embryonic condition, he hopes sociobiology will demonstrate that the preservation of nature is essential to the protection and nurture of the human spirit.[50]

**6.** ***The perfectability of man's behavior is a crucial issue.***

In sociobiology, gene-culture coevolution predicts that some human behavior can significantly change within 1000 years. In his popular works, Wilson asserts that by agreeing upon goals for human evolution, we could slowly manipulate the genes and move toward a desired behavioral pattern. We would like to speculate that this program of genetic manipulation has already been attempted, and that its unsuccessful outcome is recorded for us in the Biblical history of Israel with its emphasis upon genealogy, "seed," and being a chosen people. In this interpretation, we view Israel as a nation with the appropriate gene-culture milieu for apprehending the existence of one Creator God, Jehovah. But given this base, the nation failed to progress closer to the goal of pleasing God in spite of a process analogous to gene-culture coevolution. The laws given by God were to guide community life—the "culture." As for the "genes," great emphasis was placed upon marrying within the household of faith. Often, unbelievers and lawless Israelites were slain. Yet repeatedly, numbers of the remaining Israelites fell away. Clearly, this form of gene-culture manipulation did not work. Having foreseen that corrupt human nature precludes the self-perfectability of man, God foreknew the need for the

Incarnation. Through Christ, a new nature and the knowledge of God become available to every person by Spirit-imparted faith regardless of genetic or cultural background.

In conclusion, human sociobiology has the potential of becoming a religion of scientific materialism. Within it, mechanistic explanation and evolutionary myth replace traditional religion. This we utterly reject. However, areas of complementarity between Christianity and the science of sociobiology have been largely ignored by Evangelicals. A sociobiology freed from its mythological overtones could deepen our understanding of human nature and God's activity in His creation. On the other hand, because sociobiology focuses solely on man, it can tell us nothing about the nature of God, why we are the special objects of his love, or the potentialities of Christ-redeemed people.

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# The Sociology of Religious Organizations

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*Organizations have a clear advantage over individuals in achieving goals. They can mobilize resources, coordinate the skills of their members, and both direct and motivate them to achieve a unified action towards delineated goals. Some of the disadvantages of organizations include the tendency for them to expend a great deal of effort to grow for the sake of growth, then to slowly lose sight of their original goals and purposes. Their focus gradually changes to serving the needs of the hierarchy as opposed to either its members or higher goals, such as altruistically serving outsiders. Another problem is that organizations tend to take on a mystical quality and at times are viewed as sacred entities. This trend is especially common in religious organizations popularly known as cults. It is also true of organizations which tend to feel that they have God's exclusive blessing, or serve a major role in God's plan.*

Religious organizations, both so-called cults and the mainline denominations, have received much criticism lately by the news media, scholars and others. Although much research exists about the various functions of religion and the human needs it satisfies (see Zaretsky and Leone, 1974; Meissner, 1966), much less has been written on the functions, purposes, and problems of formal organizations formed to facilitate religious goals.

Church organizations are not necessary to carry out many of the functions of religion. Any individual can study the sacred scriptures of a religion, read its devotional publications, and even perform most religious rituals such as prayer, meditiation, and communion. For this reason, many persons question the need for formal religious organizations. This attitude is reflected in statements such as, "You do not have to belong to a church to be a Christian" or "I am not against religion, only *organized religion*." A major problem with most organizations is that:

> Large-scale institutions, be they economic, religious, or governmental, take on a self-serving mentality that may . . . be antithetical to the needs of the people they supposedly serve. . . . Niebuhr discusses this fact as he accounts for the rise of left-wing radical churches of the disinherited in eighteenth century Europe. "There is present," Niebuhr argued, "the actual exclusion of the poor from churches grown emotionally too cold, ethically too neutral, intellectually too sober, socially too aristocratic to attend [to those] . . . who suffered under the oppression of monotonous toil, of insufficient livelihood and the sense of social inferiority." (Roberts and Kloss, 1979:9)

Many who are religious in the traditional sense prefer not to formally involve themselves in "organized religion" (Gallup and Poling, 1980). Polls consistently show about ninety-five percent of Americans believe in God, eighty percent consider themselves "religious," yet less than fifty percent attend church at least three times per month. Hertel et al. (1974:14) concluded from their analysis that, "while candor in expressing disbelief appeared to be on the rise in America by the late 1960s, the proportion of Americans who continue to believe in the major tenets of Christianity is not

changing dramatically." Since the 1950's, the attendance of many mainline denominations has steadily declined, but that of conservative churches has increased (Eitzen, 1974; Kelley, 1977; Gallup, 1985). Although some use this data as an indication that the beliefs of those churches that grew or lost members are true or false, the focus here is on organized religion as an institution, with a specific focus on the advantages and disadvantages of various types of organizations in relationship to the general goals of most religions.

## The Sociology of Organizations

Part of the reason for the existence of large, bureaucratic organizations today is that both our lives and our society are vastly more complex. Organizations are for this reason more functional today. Historically they were often not practical, since the population was widely scattered and most people lived in the country, often miles away from central church centers. The average early Greek and most pre-industrial European Christians were primarily preoccupied with raising food and caring for their families. Survival was foremost, not church activities. "Mechanical Solidarity" was the glue that held their society together; people were unified because they did similar work and had common problems, goals and values (Shepard, 1981).

The *manifest function* of organizations today is primarily to facilitate a wide variety of specialized goals and needs which were not dealt with at all, or not in the same way, by people until after the industrial revolution. Organizations also exist particularly in response to our modern need for incredible specialization. The glue of contemporary society is thus "Organic Solidarity," a unification necessitated by today's labor division which forces us to rely on a wide variety of highly trained separate specialists, from doctors to lawyers to auto mechanics (Shepard, 1981). At one time, a priest would deal with medical, psychological, spiritual and other concerns. Today we train ministers, psychologists, and medical specialists of many types to fill this formerly single role.

An *organization* is a formal group of persons with specific goals and objectives, as opposed to a social group which may or may not be planned, such as a street corner gang. An *institution* refers to a specific type of organization which is established to achieve a set of given, often formal, ends. Educational or correctional entities are examples. A *bureaucracy* in modern usage is a *system that organizations use to maximize their goals.* It stresses primarily a control hierarchy, formal procedures, role specialization, and objective measurement of achievement.

All organizations involve the formal cooperation of many individuals, most often a dozen or more. Formal structures, procedures, policies and roles designed to achieve the organization's goals are developed early in its existence. It is apparent to most observers that no matter what groups of people aspire to accomplish, organizations most often have a clear advantage (Etzioni, 1964). Helping the poor, carrying out research, solving medical problems, establishing colleges or hospitals, or even convincing the public of the validity of a belief structure are all usually accomplished more effectively by some type of a formal organization (Towns, 1972). This means that, with growth and time, a division of both labor and power occurs. With this follows deliberately planned communication channels designed to enhance the realization of the organization's goals. Armies, church denominations, charity organizations, schools and colleges, hospitals, prisons and the like are all organized to achieve specific group-agreed-upon goals, and those who join usually agree with them. The members of an organization often have certain goals that they individually want to achieve, but these are usually similar to the general goals of the organization.

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Organizations are also characterized by the presence of one or more power centers that control the activities of their members and insure that their efforts are directed toward achieving the organization's goals (Etzioni, 1964; Wagner, 1979). Feedback and a means of removing unsatisfactory persons (those not properly performing their tasks or impeding the goal activity of others), are both necessary (Meissner, 1965). These mechanisms include firing, forced retirement, vertical (or, more commonly, horizontal) promotion into a position in the organization where the individual will cause fewer problems. However, for religious organizations, in contrast to most others, the organization's practical needs and the implementation of typical organization goals sometimes conflict with the values most religious persons espouse. The business-related need to maintain formal rules, treat everyone alike, promote according to seniority, and pay salaries oblivious to the workers' personal circumstances are all behaviors which may conflict with the Christian mandate to forgive, help those with problems, and show concern for people as a whole.

## The Formal Functions of Organizations

Most organizations serve several functions, each of which will be discussed in reference to religious organizations. First, they typically establish *guidelines* to direct and focus their activity. Toward this end they evolve rules that force them to focus attention on areas designed to achieve their specific goals. If the denomination determines that an important goal is the establishment of schools and colleges, unified effort from the top down will be expended in this direction. The church's resources (money, time, people, *et cetera*) will be used to help insure that goals in the areas selected are achieved (Hoge and Roozen, 1979).

Second, individuals need pressure to act, even if they *agree* that the behavior the organization wants is desirable. Research has shown that "over 90 percent will not attend [union] meetings or participate in union affairs; yet over 90 per cent will vote to force themselves to belong to the union and make considerable dues payments to it" (Olson, 1965:86).

The organization itself is a source of legitimacy that justifies its goals, activities and the pressure that it puts on members. Much of our behavior will be acted out only if it has a source of legitimacy. Most of us primarily do what we assume is expected which, generally, is to behave in conformity to the norms established by the social structure and that are backed by sanctions. We attend school, go to work and, especially, attend church partly because of the local social structure and also social pressure from significant others. Little social pressure exists to coerce the population to do volunteer work in nursing homes, hospitals, or in the court system, thus few people volunteer. The social structure and society usually do not expect or coerce us to involve ourselves in these activities unless they are part of our formal work assignment.

## The Use of Goals

Goals are functional in motivating workers toward achievement. Whether the goal is to build so many hospitals, raise a certain amount of money, or some other activity, all organizations encourage their members to live up to the expectations the hierarchy has formulated (Meissner, 1966). Among Jehovah's Witnesses, for example, their headquarters sets a goal of a certain number of hours of "house-to-house" proselytizing per month, and if the congregation as a group does not reach it, the local Elders use social pressure, lectures, *et cetera*, to encourage each person to reach the established goal. An active Jehovah's Witness will often hear, "We're two hours short of our monthly requirement, so we must make a special effort during the last week so we can reach our goal of ten hours in the field per publisher." Without the organization's direction and pressure, very few Witnesses would go from door to door (Bergman, 1985). Most religions have not developed a goal of so many hours per month of formal proselytizing, thus very few church members spend much time in this activity (although some members may occasionally proselytize in this manner on their own). Goals also tend to legitimate the organization's pressurizing behavior.

*It is apparent to most observers that no matter what groups of people aspire to accomplish, organizations most often have a clear advantage.*

The purpose of an organization is to pursue and achieve a set of stated goals—presumably those agreed upon by members. Unfortunately, organizations often acquire needs that are not in harmony with their stated goals, and at times these become the members' masters. An example is a fund-raising organization that spends more money on administration than on the charity for which it was established (Etzioni, 1964). This problem has become so serious that many nonprofit agencies publish the percentages of money spent for fund-raising and administrative activities. A denomination established primarily to serve the needs of its members but which slowly evolves to serve the needs of its

bureaucracy is another example (Moberg, 1985). Goal displacement is a major problem of both religious and nonreligious organizations (O'Dea and O'Dea, 1983).

## The Necessity of Organizations

These concerns notwithstanding, organizations are extremely important. To deemphasize them would be, in the words of Zurcher and Snow (1981:477), to

> contradict what movement leaders and revolutionaries . . . have long known or argued on the basis of first-hand experience; that organization is a *sine qua non* condition for mounting a serious political challenge or a successful religious propaganda drive.

Organizations clearly have the *potential* to serve their members more effectively than smaller, natural or accidental human groupings such as friendship sets. They are also a powerful social tool that, if they direct their energies toward their goals, are far more likely to succeed than individuals or separate uncoordinated group efforts (Etzioni, 1964; Eitzen, 1974).

The last century has witnessed an increase in the scope and rationality of organizations. With this comes social, human and, often, legal rules and regulations which members must follow, or which they at least must agree to not flagrantly violate. These are often formulated in their legally binding organizational charter. Modern civilization has found that organizations, because they can coordinate a large number of human actions, create not only a powerful social tool but "the most rational and efficient form of social grouping known" (Etzioni, 1964). This trend is less true of religious organizations, partly because many of their functions have been taken over by the state (Empy, 1982; Moberg, 1984). For this reason, plus a serious loss of prestige and power, sacred organizations have recently been less effective in achieving their goals (Eitzen, 1974). The more highly organized an organization, the greater the likelihood that it will reach its goals or those of its constituency. Gamson (1975:95) found that both bureaucracy and centralization are important for success and that "the combination is especially potent" in respect to gaining or achieving its objectives. Yet these same factors also have a large potential for serious abuse.

## Developing Agreed-Upon Goals

A major problem with organizations is that uniform agreement on the organization's goals does not always exist, either within the membership or among the leaders. Lack of uniformity may allow members to pursue a plethora of goals, sometimes even attempting to subvert the goals of other factions or persons within the organization. It is also now difficult for many religious organizations to help each member fully internalize its goals; this is especially true of the older so-called liberal churches (Towns, 1972). Full commitment, though, is uncommon, even in the more conservative denominations (Yinger, 1957; Kelley, 1977). On the other hand, the formal goals of the church leader or leaders may in time receive too much attention, deemphasizing other real areas of need such as the human concerns of members. As Etzioni (1964:17) notes, an organization may give too much

> . . . attention to making money and completely ignore the morale of its employees . . . lack of attention to non-goal activities may result in staff dissatisfaction which may express itself in poor work . . . which in turn results in decreased efficiency, or even in a wave of embezzlements.

*The more highly organized an organization, the greater the likelihood that it will reach its goals or those of its constituency.*

Not uncommonly, the lack of concern for people also occurs in many religious organizations (Towns, 1972). This is especially problematic in that churches openly espouse *expressive goals*, yet often must operate according to business-like *instrumental goals*. Another problem of sacred organizations is that many religious goals are difficult to achieve. Christianity's stress on charity and giving help to others is one example. These values, though, are both more palatable and more likely to be internalized if presented and consistently supported by those persons in one's social group. Group discussions are "much more effective in changing attitudes than other methods, such as two-person discussions or lecture groups" (Etzioni, 1964:36). Lewin (1952) found that about fifty percent of the mothers who received *individual instruction* fed their children codliver oil, as per the doctor's orders, compared with almost ninety percent of the mothers who were *instructed as a group*. With instructions to feed orange juice, the figures were fifty percent compared to almost one hundred percent. Thus, assuming the concepts, values, norms, *et cetera*, that the religious system wishes to impose are desirable, they are much more effectively inculcated in a group situation. This is also true even if the values are undesirable. The German Nazi movement is a classic example.

Lewin's study of achievement in *democratic*, *authoritarian*, and *laissez-faire* situations illustrates the advantages for religious organizations of democratic, as opposed to autocratic or authoritarian, government. He

found the *laissez-faire* structure (those groups in which the leader's primary role was to supply knowledge) displayed little emotional involvement and a minimum of participation. They usually finished the assigned task, but both production output and quality were low. The *quantity* was highest among authoritarian leader groups, but the *quality* was low. All things considered, the democratic group functioned best: the *quality* was highest (although *quantity* was average), as was group morale, concern for doing a good job, and interest in their assignment. Reactions to the authoritarian leadership included such behaviors as rebelliousness, demanding the leader's attention and scapegoating (Lewin, 1952). This research has important implications for religious organizations, many of which tend to be authoritarian in structure.

*An organization, though, is often established by a few people who want to achieve a certain goal and, theoretically at least, those who agree with that goal are more apt to join.*

A major problem of religious associations is that the goals of the organization tend to be set, not by the members, but by the leaders or the power structure. Input from most members is often quite limited, especially in authoritarian sects such as the Jehovah's Witnesses or the Mormons (Bergman, 1985). Regardless of the power struggle process, once a person becomes a leader or achieves a power position, it is difficult to remove him unless he makes several major blunders that become common knowledge in the organization.

In order to achieve their stated goals, organizations should continually evaluate how well they are performing and then adjust the policies accordingly (Etzioni, 1964). Unfortunately, many religions do not seek feedback from their followers, and the unsolicited negative feedback that they may receive, especially from their dissident members, is often ignored. Dissatisfied persons are often categorized as "malcontents," and the unhappiness that these people experience with their organization is often incorrectly seen as the problem of the individuals concerned, not of the organization itself.

Many larger churches today, though, are responding to their need for feedback by utilizing extensive survey research. Many collect information from active members and those who are no longer involved or have left the church. Some denominations even have established a research division which employs competent research sociologists to gather survey information as part of an attempt to assess the church's performance in achieving its goals and satisfying its members' needs. In order to implement the results, both resources and cooperation must exist, requiring some sort of a formal organization.

An example of an organizational response to the problems of individual members and leaders was illustrated in a survey of church leaders by Ellison (1982). He concluded that, although ministers as a group were in good emotional health, associate pastors felt a *lower* general sense of well-being than senior pastors. The most frequently mentioned problem was excessive time demands. Half of those surveyed felt that they personally had overly high expectations and a certain amount of unrealistic idealism. These traits, while often functional, were also dysfunctional as they sometimes led to disappointment in what was in fact a good performance, resulting in needless discouragement. A common result of this dilemma, ironically, was loneliness. Many people regard a minister as "a step above the rest of humanity," a factor which may have significantly hindered the communication and dialogue needed to develop the level of intimacy necessary to establish a helping relationship. The solution, the authors of the study concluded, is more organizational support of the minister. Examples are magazine articles geared to the specific needs of pastors: counseling help, periodic seminars and the like. Fifty-nine percent of the sample were able to identify and articulate specific training improvements which they perceived would be helpful, including such things as more seminary training in the area of interpersonal relationships and more supportive church organization. Thus, in order to meet the needs of individual ministers, organizations must be established and supported by church members.

Frustrations, alienation, impersonality and lack of concern for individual situations exist in both religious and nonreligious organizations. These unfortunate by-products, although common, are not inextricably a result of a formal organization (Etzioni, 1964). The ideal is to maintain the values in organizations which are useful to society, and at the same time try to reduce their common faults. Impersonality, organizational bungling, treating individuals with indifference and bureaupathology may be common, but are certainly not necessary elements of organizations. The goal should be to minimize their undesirable side effects and to maximize their positive role (Etzioni, 1964).

For long-term success, it is of paramount importance that an organization concern itself with the happiness, adjustment and commitment of its members. Satisfied

individuals usually work harder and produce better results than frustrated ones (Etzioni, 1964; Towns, 1972). Unhappiness or frustration with a church's inability to satisfy basic social or activity needs produces a regression to less than full commitment to its goals. These needs include rewards for performance, fair treatment, and a low level of conflict with co-workers. The most destructive results of these problems are attempts to actively subvert the organization's goals. The results of this action, especially while one is still on the inside, can cause severe problems. Church divisions or alienation of individual members are the best examples. If the negative aspects continue or increase, members may leave and support another organization, withdraw permanently from, or even actively oppose one or all religious organizations.

Many organizations produce a tangible product such as an automobile, a well-run city, or funds to fight cancer. The end product is also a motivator, encouraging individual involvement. Most religious organizations, however, have as a main goal and product their members' satisfaction. Achievement of this focus is often related to the degree to which the organization helps its members learn sacred values and precepts, and then live according to them.

Most religious organizations are highly influenced by both the dominant society and other religions. For this reason, in harmony with the larger society of which they are a part, many of them did little to fight against racial discrimination. At first only a few religious and secular leaders, such as the Reverend Martin Luther King Jr. and Malcolm X, began to actively work to change the then existing social structure. Only then did society begin to work toward change. The churches were likewise influenced by these societal changes, and now, almost without exception, actively condemn racism. The church clearly exerts its influence on society and its laws, but society likewise influences the church and religious organizations in general (Yinger, 1957). There are considerable differences, for example, between a Spanish, a South American, and a U.S. Catholic.

Partly as a result of our changing society, almost all religious organizations tend to modify their original goals as the organization matures (Moberg, 1985). Only a few have managed to retain their original major goals (Penton, 1985). The March of Dimes was originally established to eradicate polio. Once this dreaded illness was conquered, the massive fund-raising network was not dismantled, but wisely utilized to fight other childhood diseases. Likewise, the function of many religious organizations was for centuries directly and specifically to help men and women accept a certain belief structure which they felt, if used as a guide for living, would produce happiness and/or salvation. The function of the church then slowly became more and more social, oriented toward ameliorating various society-wide social problems. From about 300 A.D. until the turn of this century, the major functions of religious organizations were hospital work, caring for the poor, the sick, criminals, *et cetera*. While today these functions are still important (especially hospitals), most have been gradually taken over by the secular state (Empy, 1982; Quebedeaux, 1982). In America one of the major functions which still remains is largely "social," not so much solving social problems as meeting social needs. Some churches, especially those experiencing growth, are again stressing the importance of making a commitment to Christ and learning to live by religious values (Towns, 1972; Wagner, 1979). Nonetheless, many are also endeavoring to expand their role and deal with healing both soul and spirit. The movement known as Christian psychotherapy is an example (Meier, 1982).

*Impersonality, organizational bungling, treating individuals with indifference and bureaupathology may be common, but are certainly not necessary elements of organizations.*

### The Need for a Structure That Fits the Organization's Goals

For many contemporary religious organizations, proper specialization is also an important survival factor. Some movements specialize in physical healing and others emphasize emotional experiences (the *charismatic* movements). Some emphasize fellowship, others stress learning (or, their opposers claim, indoctrination—examples are the Unificationists and the Jehovah's Witnesses). Others emphasize good works, but still others may indirectly teach social climbing and respectability, as is typical of some Presbyterian and Episcopal churches.

Organizations pursue in part the goals of their president, the more charismatic leaders, and to a lesser degree the membership as a whole. For this reason, input from all of these sources is important, or should be, in the development of policy (O'Dea and O'Dea, 1983). An organization, though, is often established by a few people who want to achieve a certain goal and, theoretically at least, those who agree with that goal are more apt to join. A major reason why over 1,200

denominations exist in America is that people have sought to satisfy different needs from religion, and thus take part in different churches (Melton, 1979).

If large numbers of members become convinced that goals aside from those that the church initially valued are very important and should be pursued, and the church responds by change, members who value the original goals will often be alienated. Both sides may first try to influence the leadership to alter the organization's direction. If they feel strongly about the issue, division may be the result. If enough separate, another organization may be established in order to achieve goals that they deem desirable. This is often the major reason for splits at the denominational or even church level. Another tactic is for the leaders to convince dissident members that the goals the administration desires are, in fact, the most desirable, and what these members want should not be pursued, or should be pursued later. Often a compromise is achieved; goals both the leaders and members now deem important are pursued with varying degrees of vigor.

*Most religious organizations, though, tend to be extremely frugal with their income, partly because they have to.*

A religious organization must often attempt to deal with differing goals and values among its members in order to avoid power plays, schisms, and attempts to subvert the primary goals of the organization. Schisms over conflicting goals are a well-known feature of all religious organizations. Instrumental goals considered important to the organization's administration, such as the building of edifices, increases in membership statistics and number of employees, dollars taken in, and increase in community influence, are not always valued by members. These may not be stated goals, but for many reasons tend to be valued—or at least present.

More serious than the existence of an informal structure coexisting within the formal is an attempt to subvert the organization's major goals. Often certain goals are stated and commonly believed to exist, but in actuality other goals are more important. The public commonly believes the purpose of prisons is to rehabilitate criminals. The main function is actually custodial or an attempt to apply the "just desserts" theory, or both (neither of which may work for rehabilitation goals). The purpose of mental hospitals is likewise viewed by the public as to "cure" patients, yet the main service actually provided is also custodial. Thus, with religious organizations the given and real goals must be periodically examined and reevaluated. In order to continue to serve their members, they must be aware of their progress and respond to identified needs, an activity which in the long run is necessary for their survival.

Although organizational structures are often functional, they can also often impede the futherance of their own goals. As Zurcher (1982:478) notes, "Organization is necessary if a movement is to make any headway in its goal attainment efforts; yet organization can also lead to acquiescence and frustrate the attainment of goals." The problem is not organizational structure *per se*, but organizations that, for whatever reason, fail to develop and maintain commitment. Especially problematic and ironic is the fact that many organizations actually discourage member involvement by putting road blocks in the way of their activities, which are openly and obviously directed to achieving the organization's own goals. An example would be the Watchtower Society's insistence that their followers' proselytizing be carried out primarily one way, even though this method (door to door canvassing) is one of the least effective means of gaining members (Bergman, 1985). The most effective method by which religious organizations, as well as social movements, achieve converts is through friendship networks (Lofland, 1982).

### The Problem of Money

A major problem that all religious organizations confront is paying bills. Olson (1965:13) notes that:

> Patriotism is probably the strongest non-economic motive for organizational allegiance in modern times . . . but despite the force of patriotism, the appeal of the national ideology, the bond of a common culture . . . no major state in modern history has been able to support itself through voluntary dues or contributions. Philanthropy contributions are not even a significant source of revenue in most countries. Taxes, compulsory payments . . . are needed. . . . If the state, with all of the emotional resources at its command, cannot finance its most basic and vital activities without resorting to compulsion, it would seem that large, private organizations might also have difficulty in getting the individuals of the groups whose interest they may attempt to advance to make the necessary contributions voluntarily.

This is very much the case with religious organizations. In spite of appeal letters designed by slick Madison Avenue advertisers and their psychological consultants, and constant pressure from television evangelists, most religious organizations have a difficult time paying their bills. This is partly because the internal pressure to expand their activities tends to grow at a rate close to their income growth. The public's impression, though, is that many of them are wealthy to the

point of excess. The validity of this assumption depends upon one's interpretation of "wealth." Most church buildings are contructed with some voluntary labor, and donations of material and supplies by the congregation are common. In Europe, partly for this reason, their construction often took many centuries. The motivation for these edifices typically is not from headquarters or the central organization, but because of the desires of the local members. The Catholic Church is often criticized for its elaborate edifices in Europe and elsewhere, but in most cases the Church (i.e., its Rome headquarters) has little input in the construction of local facilities. A mixture of love and guilt help to produce the high level of labor and monetary donations needed from individual members.

Even in modern America these factors are present. The painting, plastering, electrical work and most of the finishing are not uncommonly done by members on weekends. Some church edifices and extravaganzas, such as Schuller's "Crystal Cathedral" in Orange Grove, California, have drawn sharp criticism. Nonetheless they are often designed, in part built, supported and financed by the congregation, and evidently meet their psychological and status needs. The edifice may be "worth" millions, but may cost thousands to construct and rarely can be sold for more than a fraction of its market value. A group of people want it built, and the fact that they are under the banner of a religious organization indicates only part of the group's purpose. Most organizations desire edifices, and church groups are no different.

*To maintain an effective large church, one must usually organize into smaller churches (sometimes called the "home-church") made up of about ten to fifteen members.*

To encourage their members to donate money and property, religious organizations, from television evangelists to one's local church, use psychological coercion ranging from passing the collection plate to indirect threats of the loss of God's favor. Without donations most churches couldn't survive without a radical change in their practices, and all church hierarchies are keenly aware of this. More money is freely given to churches and religious organizations than any other type, and the amount would probably be high even if there was no compulsion whatsoever. Yet in spite of this, the reality is that bills are sometimes not paid. In churches, as elsewhere, some unnecessary extravaganzas exist, as well as abuse and waste. Most religious organizations, though, tend to be extremely frugal with their income, partly because they have to. They often pay most of their workers' salaries—from youth directors to janitors—at levels far below comparable outside employment, and rely heavily on volunteer help to function. A survey by the Christian College Coalition found that salaries and benefits at Christian colleges averaged around fifty percent *less* than those of state universities. Heavier teacher loads were assigned (often up to twice those at a state school), and little opportunity existed to publish and do research. A survey by Knap (1982) found that a result of leaving a secular university to teach at a Christian college was that publication and research output diminished significantly.

## The Halo Effect

Churches are often able to achieve some of their objectives more effectively and with less cost because of the perception that work done for any part of a church organization, whether sweeping the floors, counseling parishioners, preaching the gospel, or publishing a magazine, is "the Lord's work," a ministry, or serving God (Bergman, 1985; Benson, 1960). Even the Red Cross and other philanthropic organizations owe much of their success to the perception that work done for them is part of one's Christian duty, and as such will be bountifully rewarded by God. Most churches have encouraged this work, and many teach that it earns "brownie points" in heaven. Although many secular organizations have done effective work, church organizations such as the Salvation Army, Catholic Social Services, and the Society of St. Paul have for years carried much of the load, especially in the past. The state, of course, has the advantage that it can collect taxes by compulsion in order to pay for services offered. Yet most churches are, without this advantage, still heavily involved in visiting the sick, helping the poor, finding jobs for the needy, consoling the bereaved, helping victims of disasters, and myriads of other tasks, especially those that require attention to individual persons. And to do this, Olson notes (1965:47) that church and religious groups in general, although

> organized to obtain a collective good . . . find . . . a certain minimum organization quest that must be met, however little of the collective good it obtains. . . . There are the quests of communication among group members, the cost of any bargaining among them, and the cost of creating, staffing, and maintaining of any formal group organization.

These costs are both financial and nonfinancial (time, energy, material resources).

Religious organizations, if they are successful, tend to grow. Growth, ironically, often results in changes which spell their doom—or at least major changes in their goals, values and standards. Small groups can be far more effective in satisfying the members' needs and are more likely to exist without change for a longer period of time (Moberg, 1984). In addition, each member, because of the intimacy possible in a small group, may view involvement as more important, and his or her input and the significance of what happens to the group as more valuable than if in a large group (Olson, 1965:56; Bergman, 1985). This principle, on which Olson elaborates extensively, has been applied to some of the most successful churches in the world. To maintain an effective large church, one must usually organize into smaller churches (sometimes called the "home-church") made up of about ten to fifteen members. The largest Christian church in the world, which happens to be in Korea, has well over 150,000 members and is still rapidly growing (Cho, 1981). How a Christian church managed to flourish to this extent in a non-Christian country has caused a great deal of speculation among church researchers. The reason for its success is probably its organizational structure, broken into hundreds of small units of sixteen to twenty persons, each headed by a full or part-time church staff professional. This small "home group" cell functions as a church, but meets once or twice a week in the homes of members and is assigned to work on various social programs as a group. They work mostly in an intimate group that is part of, but in certain ways separate from, the whole. The whole body meets once a week for various services, but the basic church could be described as a whole made up of hundreds of small, identifiable groups.

*If within a large organization people do not have their needs met, they will often join smaller groups.*

The success of this principle does not surprise researchers. The reputation that large churches have of being cold, impersonal, *et cetera*, is well known. Many people choose a small church for this reason. Some denominations insist that their churches grow no larger than a little over 100 members. When they reach 150, they divide for just this reason. To be effective, a church must be small, personal, and designed in such a way that the input of each member is important, or at least noted (which is difficult, even with only 100 members).

The success of the Unification Church has been attributed partly to its use of the home-church technique (Quebedeaux, 1982). Even in large churches, studies have shown that informal "home group churches" tend to form spontaneously. Each person in the church, even though several hundred (or several thousand) may attend the services, is part of a small social network that serves as the member's primary social unit, both at home and in the church. The commonness of informal networks, which are often called "cliques" by the church members, underscores both the need and function of small organizations. If within a large organization people do not have their needs met, they will often join smaller groups. Indeed, the success of large organizations is often a result of the success of the many smaller groups that make up the whole. Complaints about cliquishness more often stem from the inability to become part of one rather than their existence, as their complainants often allege.

*Many organizations that were originally established for the purpose of* helping people *turn into a task master, forcing those it once served to serve the organization for its own ends.*

Church organizations are highly functional in reaching their goals, but can also impede their accomplishment. They can cause numerous problems in the lives of their members—not the least of which is what sometimes becomes damaging social pressure to conform to standards and nuances. A major goal of religious organizations is to survive and prosper. To do this, they must strive to achieve the advantages of both large organizations and small, personal groups.

### Misuse of Organizations

Much conern in recent years has been expressed over alleged human rights abuse by large, formal organizations. The Unificationists, the People's Temple, and Jehovah's Witnesses are major examples (Penton, 1985). Many organizations that were originally established for the purpose of *helping people* turn into a task master, forcing those it once served to serve the organization for its own ends. Some of the modern religious organizations which have their origins in the last generation or two are examples. Some even claim that God has only one "organization" through which He works, and theirs is blessed with this honor.

Actually, "religious" organizations in the modern sense did not exist until well after Christianity was established (Janes, 1887). The Greek city-states were the closest, yet these were limited to a local, functional governmental structure. For most of history, many of the functions of religious organizations were taken care of by the community or the family unit. The source of the idea for complex modern "organizations" was probably the government, not the Scriptures. Other than nation, tribe, tongue, or people, no equivalent word exists in ancient Greek or Hebrew for this modern concept. The closest is στοιχεω which means "to bring together in one," such as "one army made up of many soldiers."

The ancients were highly individualized, and although they were united with "their people" and conformed to the needs of the group, to them pleasing God did not relate to "membership" in an organization. They identified with their people or tribe, but their relationship to God was often an individual matter. For most of the ancients, primarily one dominant religious tradition existed around them, was part of their society, and shaped most of its aspects. Religion was often not a separate organization. Competing religious traditions were often slowly assimilated or eradicated. Loyalty to some formal organization did not exist, even in the early Christian experience. Loyalty was to family, city, state, one's people, personal values, and, of course, God.

When some sect members refer to their denomination as "God's Organization" they are exploiting an idea that did not exist until long after the establishment of the Roman Catholic Church, which actually was not formally established until after the Council of Nicea in 325 A.D. and was loosely organized until the Middle Ages. The early Christian church did not have a complex formal organization but was mostly a body of believers, held together at first only by the authority of the Apostles, then by oral teachings and later written records, especially the letters of Paul, the gospels, *et cetera* (Grassi, 1975).

Some contemporary groups teach that salvation is dependent on membership in their "organization," claiming that one must be inside of it in order to be saved, just as one must have been inside of the Ark to escape destruction from the great flood of Noah's day. They claim that God now has, and had in the past, one true organization. This specific concept of an organization is relatively recent, of middle Latin origins (eighth century), from *organizatio*—a unified group of separate but dependent elements, all working harmoniously together. Mainline Protestant tradition has generally taught that God does not have one exclusive earthly organization, only a body of believers held together by a common hope, united only by the glue of Christ, not the threats of humans (2 Corinthians 1:21,22; Galatians 2:16,20; Ephesians 1:3,4; 1 Corinthians 6:11; John 12:32).

## Summary

A review of the functions of religious organizations, including their advantages and disadvantages, finds that they facilitate goal accomplishment by motivating workers and coordinating resources, but they can become self-serving and impersonal. A major concern today is the need to modify religious organizations to facilitate, and not hinder, human relationships with God. The dilemma is not easily answerable, and individual situations are probably crucial in determining the total effect of a specific organization. Their abuse, well known in the so-called cults (like the People's Temple), is often stressed. Less stressed are the social achievements and benefits to individuals of large religious organizations which, through united effort, achieve far more than can isolated individuals.

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# Communications

## *CONJUGATE PROPERTIES AND THE HYPOSTATIC UNION*

The emergence of complementarity as a way to reconcile problems in theology has been beset with several difficulties. The major difficulty lies in determining exactly what Bohr meant by the "principle of complementarity." As eminent a scientist as Einstein remarked that he had not been able to achieve a "sharp formulation" of the principle. This lack of clarity has led to increasing criticism of the validity of viewing theology in complementarian terms.

In this paper, we propose a method of dealing with complementarity which does not depend on the obscurities of Bohr nor on redefinition of terms. In doing so, we circumvent the difficulties of past approaches while maintaining strict adherence to modern quantum mechanics. By consideration of the relationship between the hypostatic union of Christian theology and the modern theory of waves and particles, it is possible to handle complementarity without recourse to Bohr or Bohr redefined. The modern viewpoint accepts that quantum theory is not afflicted by paradox and does not require Bohr's semiclassical interpretation of physical phenomena.

Quantum mechanically, a particle is represented by a wave disturbance confined to a region of space. The localized wave phenomenon is called a wave packet. The intensity of the wave packet at a given location in space gives the probability of finding a particle at the location in space. All physical objects possess varying degrees of "particleness" and "waveness" depending on the degree of localization of the wave packet. The localization is governed by the uncertainty relation for the linear momentum and position of the wave-particle. Uncertainty relations show that as one tries to "squeeze" nature into revealing both particle and wave properties with equal precision, there is an unavoidable interaction which frustrates the attempt. The pair of complementary quantities which satisfy the uncertainty relations are called canonically conjugate variables.

In Bohr's original analysis, no matter how far physical phenomena transcended the scope of classical physics, their account was to be sought in classical terminology. On the microscopic level, however, one cannot make the sharp distinction between the natural phenomena and the instrument with which it is observed. Whether an electron or a photon appears as a wave or as a particle depends on the nature of the measurement that is made. A physical situation cannot be completely specified with classical variables, but must be described by an imprecise specification of a pair of complementary quantities whose sharpness in a given environment is defined by the uncertainty principle.

We have chosen the wave-particle duality as the paradigm for our discussion; however, similar comparisons hold between any pair of conjugate variables. It is possible to identify at least eight points of comparison between the theological principle of hypostatic union and the modern complementary view of waves and particles.

1. ***Both models have two natures in a single entity.***

The hypostatic union and the wave-particle duality postulate the existence of two natures which are integrated into one entity. The wave and particle natures pertain to a single entity properly called the wave-particle, while the divine and human natures pertain to a single person properly called the God-man. The coexisting natures cannot be separated, and, at a certain level, appear to be incompatible. However, this is due to the limitations of human perception and the unjustified transferral of concepts familiar in one domain into another.

2. ***The God-man and the wave-particle have properties which transcend either nature acting separately.***

The synergism between divine and human, and between wave and particle, endows both wave-particle and God-man with properties transcending those of either nature acting separately. For example, without the dual nature of electrons, it is difficult to explain the existence of the atom, diffraction, scattering, *et cetera*. Likewise, many theologians hold that if Christ were not both God and man, atonement for sin would not be possible. There is no flexibility in the hypostatic union to account for Christ's resurrection in purely human terms, nor is there any possibility of explaining physical phenomena by purely wave or purely particle phenomena.

3. ***Both models possess properties described by conjugate variables.***

Canonically conjugate properties occur in both the hypostatic union and the wave-particle dualism. The description of an event in either realm proceeds by specification of a pair of mutually complementary quantities. When measuring the

position of a particle, for example, one seeks to squeeze the wave packet representing the particle into a small region of space. Since waves are not easily localized in space, measurement of the position is subject to uncertainty, making it difficult to tell how "wavelike" and "particlelike" is the resulting phenomena. A similar situation exists Christologically. The God-man is described by both human and divine attributes, and it is difficult to determine in a given situation which attribute is operative. At a certain level, the complementary properties appear dualistic and incompatible; however, both descriptions are necessary to fully characterize the properties of the God-man.

4. ***The conjugate properties in both models obey an uncertainty principle.***

Once it is shown that the hypostatic union and the wave-particle duality contain a principle of complementarity, the existence of uncertainty relations between the conjugate properties follows necessarily. For example, if an experiment is performed to reveal both particle and wave aspects of matter to infinite precision, an unavoidable interference takes place which frustrates the attempt. A given experiment will emphasize the details of only one complementary property at a time, depending on the choice of measurement.

It is also difficult to perceive both human and divine natures at the same time in the God-man. Either the divine or the human nature is featured, depending on the interaction of Christ with the universe. It is possible to envision a relationship similar in form to the Heisenberg uncertainty principle, which describes the combination of divine and human in the God-man. In symbols:

$$\mathbf{d}(\text{divine}) \times \mathbf{d}(\text{human}) \sim \mathbf{C}$$

where **d**(divine) and **d**(human) represent the uncertainties expected during an attempt to specify the divine and human natures of the God-man simultaneously, and **C** is a constant. Such a relation shows that absolute precision in the specification of the divine nature of Christ is accompanied by complete uncertainty in his human nature, and provides a possible explanation of how Christ could walk on water in spite of being human. Although both natures are necessary for a full description, only one or the other is featured at a given time. The other attributes are retained in the complementary nature of Christ and are hidden, not absent. The same is true for waves and particles.

5. ***Viewing the complementary properties as classical entities leads to irrational conclusions.***

According to Bohr, physical phenomena must be expressed in classical terminology. The point of the modern theory, however, is that quantum entities *cannot* be described in classical terms without leading to absurdities. By making a classification according to waves or particles, we force a classical description on things that are by nature unclassical. Photons and other quanta do not obey the laws of classical mechanics; they obey the laws of quantum mechanics.

In the same way, to press the hypostatic union into a "classical" description of what is divine and what is human leads to the same logical absurdities that arise when trying to reconcile waves and particles. For example, it is impossible to explain how Christ could turn water into wine and rise from the dead based on our limited "classical" perspective of what constitutes humanity. On the other hand, from a "classical" view of what constitutes divinity, it is difficult to explain why a divine being would need to eat and sleep. The impasse is avoided by postulation of complementary natures which cannot be viewed in all detail at all times. In a given situation, either the divine nature or the human nature will be featured, depending on the interaction of the God-man with the world. At a deeper level, the two natures of Christ are not incompatible; the paradox merely reflects the inadequacy of human comprehension to achieve a rational understanding based upon our limited notions of what constitutes "human" and "divine."

6. ***The conjugate properties discriminate against alternate models of the hypostatic union.***

An effective analogy to the hypostatic union should be capable of discriminating against other forms of the doctrine. Showing that the wave-particle dualism is unlike one thing does not prove that it is like something else; however, the corroborative support is satisfying.

There are at least eight alternative models that have been proposed for the union of God and man. These theories differ from the classical doctrine in that they deny either: 1) the reality of the two natures (Ebionism and Docetism); or 2) the integrity of the two natures (Arianism, Apollinarianism, and the theory of incomplete humanity); or 3) the union of the two natures in one person (Nestorianism, Eutychianism, and the theory of gradual incarnation). The properties of conjugate variables are incompatible with the alternate models for the following reasons. First, the uncertainty relation governing the conjugate variables is an explicit statement that there *is* reality to particle and wave interpretations of matter. Second, there is no subordination or loss of nature implied in the statement that matter has a dual nature. Third, there is no incomplete integration of the two natures. Either waves or particles can be featured, depending on the experiment, but the wave-particle has not "given up" any of its wave or particle nature during the integration. The measurement has merely dictated whether waves or particles are seen by the observer. Matter at its most fundamental level is both wave and particle, just as Christ is both God and man. There is no provision in either model for a "half-man/half-God," or a "half-wave/half-particle."

7. ***In spite of the union, the two natures are retained in both models.***

In traditional doctrine, the two natures are unchanged by the hypostatic union. The argument is: if divine attributes are conferred to man, man ceases to be man. Therefore, the divine and human natures cannot be mixed to form a third nature which is neither one or the other. The humanity in Christ is not deified.

Can the same be said of waves and particles? This is a difficult question, but the answer is probably yes. In the classical view of particles and waves, the answer is surely yes. Particles and waves are mutually exclusive concepts, and

there is no intermixing of the natures. In the modern viewpoint, however, the answer is more elusive. It is a "chicken and the egg" issue. In order to find out if the wave nature of an electron has been modified by the presence of the particle nature you have to make a measurement; but when you make a measurement, you change the very thing that you sought to measure. In spite of the dilemma, the majority of physicists believe that conjugate properties such as position and linear momentum are potentially present in nature, but not actually present until a measurement is made. For example, in the single slit experiment, as the slit is closed, the diffraction pattern shrinks and begins to look as though it is caused by straight-line motion of particles through the aperture. As the wave nature of the electrons appears to vanish as the slit is closed, however, it still must be potentially present to produce the interference pattern, which can only arise by wave interference. Hence, while one complementary nature is featured the other is suppressed, but not changed into something other than of wave or particle nature. There may be less of one nature than the other during a measurement, but the wave and particle natures are unchanged. This is similar to what theologians mean when they propose that the union occurs without corruption of the natures.

8. ***Reconciliation of the hypostatic union and the wave-particle dualism is dependent on the role of human perception.***

Whether an electron appears as a wave or a particle depends on the nature of the measurement that is made. The wavelike or particlelike character of an electron lies only in the eye of the beholder. No one can really say when a wave packet has been localized "enough" to be considered a particle. A similar situation occurs when viewing a three-dimensional cube drawn on paper—a paradox arises when the observer is asked to specify which side of the cube is facing forward. Some individuals see the "back" surface as forward; some see the "front" surface as forward. In forcing a notion of meaning upon a series of lines, or in pressing matter to fit a classical model of either particles or waves, an antinomy is created which forces us to conclude that the universe is by nature irreconcilably dualistic. In other words, we as observers are the true source of the paradox due to our insistence to describe things by particular models. In the case of the hypostatic union, the God-man seems impossible because of our deep-seated convictions of what is divine and what is human. In our insistence on preconceived views of humanity and divinity, we are forced to regard the hypostatic union as paradoxical and dualistic. This no longer need be true, as it is possible to resolve a similar paradox in quantum physics by way of conjugate variables.

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## *A DIFFERENT CHRISTIAN VIEW OF NUCLEAR WEAPONS*

" 'I don't know what weapons we will use in WW III' said Alderman Burton F. Natarus, 'but I know the weapons we will use in WW IV—rocks.' Everyone laughed." These are the last lines to a New York Times article on the signing of an ordinance declaring Chicago a nuclear weapon free zone. Chicago joined with forty other localities around the country in legally banning various forms of nuclear weapons, their design, their manufacture and storage.

I wish to explore a different view of nuclear weapons, since I long for a new clarity in the purpose of nuclear weapons. Such understanding may help the church formulate endeavors consistent with its mission and may result in the eventual elimination of nuclear weapons and a world free from war.

War is abhorent . . . all Christians agree. But I think it unwise to be so certain, as some are, that man's development of nuclear weapons is abhorent to God. We have experienced a form of peace for four decades that can be largely attributable to nuclear weapons. Unfortunately, it is a form of peace that is not guaranteed and is far from perfect. Many historic periods of personal and national peace have been similar.

There was a form of imperfect peace at the time of the birth of Jesus called the *Pax Romana*, the peace of Rome. *Pax Romana* was the peace of the all-powerful dictator who had defeated all known enemies. God chose this place and this time to bring forth His perfect solution to the problem of mankind's sin and death. Rome and the imperfect peace it brought was an essential part of the stage God had set for this blessed event. God had been setting this stage for many years. Leading up to all of this, He caused the exodus to teach His people to trust Him. Nebuchadnezzar was His agent when his warriors triumphed over the Hebrews and brought them out of the Holy Land. Thus, they learned that God was universal and existed outside the temple. Cyrus was His agent when his warriors conquered Babylon. Thus, a remnant of the Hebrews returned to the Holy Land to become a holy rather than a nationalistic people. Alexander was His agent when his warriors conquered Babylon and the East, establishing a common language. Thus, the Word some 500 years later was easily transmitted. Rome, through military might, built roads along which the Word could speed. Clearly God has used the military dimension and mankind's aggressive desire for power to achieve His will. Are we too close to our own history to see God again using the military dimension to achieve His will?

Prior to nuclear weapons, wars had a clear loser and winner, with an occasional draw. Most rational people agree that another world war would only produce a loser. Those not directly killed or subsequently destroyed by radiation effects would eventually starve or freeze to death. Nuclear winter is a grim forecast. Nuclear weapon scientists and engineers have made the waging of total war a completely unacceptable way for major nations to achieve nationalistic ambitions. So, it is reasonable and rational to ask, "Why has God allowed His children to learn how to destroy His creation?"

Or, the more fruitful question one might ask, "Has God been involved with the development of nuclear weapons and, if so, why?"

At the end of World War II, nuclear weapons were viewed simply as extensions of conventional arms. Battlefield management and new weapons systems were designed in accordance with World War II weapon delivery systems. Nuclear war would just be the newest kind of hell, just as the fire storms in German and Japanese cities were new kinds of hell in World War II. The dominant attitude was that a nation could, in the aftermath of a nuclear war, resurrect itself to live and fight again. The United States had used two small nuclear weapons and were the victors. Japan was the loser, but quickly returned to a normal life. Two small nuclear weapons did not destroy the world, nor did they prevent a defeated nation from returning to its prewar vitality. So, in the 1950's few Americans believed that nuclear weapons could lead to the destruction of the world.

Today many United States citizens, including leaders of many Christian denominations, strongly advocate the immediate removal of all nuclear weapons from the world's stockpiles. The implied picture is that the current level of fear would be greatly reduced and an era of international goodwill and major reductions in military budgets would occur. This would be followed by extensive international cooperative programs aimed at the elimination of the world's major problems. These hoped for consequences must be very seriously and throughtfully reviewed. We must realistically assess what the world situation would be like in the near term if the major powers renounced nuclear weapons.

The most accurate estimation of the future is most often grounded in the past. I submit we would, soon after the elimination of nuclear weapons, experience a major confrontation with the Soviet Union. Part of that confrontation would be the awareness that Soviet missiles, loaded with "conventional" warheads, are aimed at targets in the United States with pin-point accuracy. The word "conventional" really means non-nuclear, for the warheads could carry anything from high explosives to modern nerve gas, to various germs and bacteria. Our reaction to the threat would be swift, with our intentions and demands clearly stated. Regardless of the Soviet reactions to our response, we would be sufficiently concerned to mount a very large conventional arms buildup. Automatically included in that buildup would be a very large army able to be transported to any point in the world, and an air force that would establish a global array of bases for movement of the armed troops. The military budget would greatly increase. The United States would be put on a fairly permanent military alert status with much power given to the military.

Some advocate that nuclear weapons be eliminated because they are excessively expensive, significantly reducing monies available for helping the unfortunate. It is naive to believe that if our military budget were reduced, the government would automatically move that funding to help the needy. That is wishful thinking with no basis in fact or history. There would be much less money for the unfortunate because of the massive costs associated with building up the conventional military arm. It is helpful to view money spent for nuclear weapons like one views home owner's insurance. Is insurance a waste? The answer can be "yes" if it seriously reduces the quality of life and ability to do ministry by being overinsured. However, we all find some compromise for the right amount of insurance, but having none is not the minimum stress position. It turns out that nuclear weapons are a very effective and inexpensive national insurance policy. The annual budget of the Lawrence Livermore National Laboratory for nuclear weapon design activity is less than the money sent annually in error by the Social Security system to people who have died or are double-dipping. It costs about $100,000 to build a typical nuclear weapon and $10,000 per year to maintain it. One division of troops in the U.S. army costs over $100,000 a day! That is why the United States in the early 1950's and 1970's placed nuclear weapons in Europe, rather than whole armies with many divisions, to stalemate the Russian and Warsaw Pact army buildup—pure economy, coupled with the wisdom which said that the average U.S. citizen was not prepared to have his or her sons drafted into military duty in the presence of only a threat.

Most rational people greatly fear the acquisition of nuclear weapons by smaller or Third World countries, especially countries led by irrational leaders. It is the legislative policy of this country to deter and actively discourage the proliferation of nuclear weapons. Specifically, India suffered embargoes of critical materials and South Africa was threatened with the same when they appeared to be on the verge of joining the club. Both reviewed their goals and decided to meet them with conventional arms.

To summarize thus far: Elimination of nuclear weapons will destabilize the world and be the end of our current mock peace. The size of the U.S. military dimension would greatly increase, and a major war would be much more probable than it is now. We would experience a significantly large increase in our military budget.

The present time of mock peace is a very unique time of opportunity and responsibility for the church. It is the time to passionately and assertively address not only the problems of the world with Jesus' model of agape love, but to broadcast the good news to the world with all the passion, talent and creativity used trying to prove that the existence of nuclear weapons is evil. Just as the absence of Rome's stablizing influence would have been contrary to God's plan, so the removal of nuclear weapons may be contrary to His plan. While we may never agree on the answer to the question, "Did God cause or use the military dimension to achieve His goal?", we must not be dissuaded by that debate from striving to answer the much bigger question, "Now that we have a time when war cannot be won, a time when there is again a mock peace among the major nations, what are we Christians going to do with it?" Just as a time of modified peace was needed to allow the spreading of the Word via the universal language of the day on the universal roads of the day, so today's peace has another universal language (English) and unparalleled communications technologies. These communication tools (often arising out of a military dimension)—word processors, television, radio, telephone, video

and audio tapes (all found in homes, offices, and schools); satellites; fiber optics; *et cetera*—are discoveries that make the communication tools of 1940 seem oddly primitive.

Why has God given us such a time of peace, and unprecendented growth in communication tools? What is the good news He wants to send? The church must get on with organizing, funding, leading, and doing what it is most skilled at and is chartered by God to do: sending the good news of eternal life to all the world via the tools God has provided. Let the skills, passions, and commitments of those who now fight for destruction of the peace brought by nuclear weapons work instead on using this peace, for that is why the peace is here. Church spokesmen cannot eliminate nuclear weapons. They are here, will stay, and will continue to grow in many technical dimensions until the nations who own them feel sufficiently secure to eliminate them. That security will not occur via the forces of economics, science or military might, but only through the incorporation of the spirit of Jesus Christ into the fabric of the life of the world. That incorporation is the business of the church using, when appropriate, the tools of the scientist and the economist. Let us assertively love those whom some would classify as enemies, in ways that would please our Savior and Lord . . . in ways that will model His coming kingdom. Let us recognize when He has been in our midst and guiding our history to achieve His ends.

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## *COPERNICUS, COURAGEOUS CANON*

Nicolaus Copernicus (1473–1543) was born in German Thorn; he was the youngest of four children—his sister became a nun. His father was a wealthy burgher and town official. At ten, upon the death of his father, he was adopted by his uncle Lucas Waczenbrode (1447–1512). At eighteen he entered the century-old university in the capital Cracow, where he studied astronomy under Albert Brudzewski; he was good in mathematics. Three years later he went to Ermeland, where his uncle had been made bishop of one of the four dioceses of East Prussia; he lived in the bishop's palace at Heilsberg (Lidzbark Warminski).

In 1496 he went to study law at the University of Bologna. While there, he also assisted the astronomer Domenico Novarro of Ferrara (1454–1504). He spent the great Jubilee Year (1500) in Rome, where he taught mathematics privately and gave a public lecture on astronomy. Meanwhile, at twenty-four he had been designated a canon of the cathedral at Frauenburg. After a trip back there he returned to receive his doctorate in canon law from the University of Ferrara and to study medicine at the University of Padua. At thirty he became secretary and later physician for his uncle. Six years later he was sent on a diplomatic mission to Cracow; he published a translation of a minor Greek poet. Copernicus was truly a Renaissance humanist. He acted as advisor and physician to his uncle until his death in 1512, remaining at the cathedral in Frauenburg.

At Frauenburg he employed his leisure studying cosmology, making some astronomical instruments, and taking some planetary observations; there are about sixty records of data (he was not a good observer). At forty-one, however, he did receive a request from the Lateran Council to reform the Julian calendar, which he declined to alter, being of the opinion that the known solar and lunar positions were too inaccurate for calculations. Two years later he was assigned responsibility for administering the temporal and spiritual affairs of outlying estates of the Chapter so that he had to live in the castle at Allenstein, the capital of Ermeland. In 1519 the whole territory was besieged by the Teutonic Knights; Copernicus arranged for its successful defense and restoration. In 1522 he recommended a new money system for the Prussian Landtag; he conceived the law credited later to Sir Thomas Gresham (1519–1579). He is regarded as the founder of Polish economics. At fifty he was appointed Administrator General for the diocese during a six-month interregnum between two bishops. He was truly a man of affairs; he served public needs. Yet he would take the time to travel north from Heilsberg to Königsberg to treat a man that was ill.

Copernicus never practiced astrology. There is no unanimous agreement as to his real contribution to astronomy per se. Some would extol him as the perfecter of antiquity; others, as the harbinger of modern astronomy. He did, of course, put old wine in new bottles. The ancient goal in astronomy was "to save the appearances"—a mathematical task. (Greek mathematics [learning] consisted of the quadrivium: arithmetic, geometry, astronomy, and music—no natural philosophy.) Copernicus did restore the methods and parameters of practical astronomy, but he himself was more mathematically inclined. Since, in his manuscript sketch, "Commentariolus" he visualized only 34 epicycles being requisite for planetary motions, as contrasted with the 80 required by Ptolemy, many have concluded that his system is simpler. Actually it is more complex. What is more, the data available at that time would not have been sufficiently accurate to discriminate between the two models.

What is evident from Copernicus's point of view is the order and harmony of the planetary system, their relative distances from the sun—a matter of aesthetic insight based upon a mathematically different reference point. Nevertheless, the model was real to him. There was no radical discontinuity with the past; rather he sought to restore the purity of celestial circular motion in lieu of Ptolemy's ad hoc equant. The so-called Copernican revolution was a matter of degree, not of kind. There was, to be sure, some natural philosophy contrary to Aristotle, *vide licet*, his insistence upon no "fire-filled" space beneath the moon, his placing of the

earth in the circular-motion aether, his assignment to each planet of its own gravitational attraction, his claim that "the earth is in the highest degree akin" to the moon. Book I of *De Revolutionibus* does deal generally with cosmology, but the major part (five books) is concerned exclusively with mathematical astronomy, that is, planetary motions, including those of the earth and moon. The final acceptance, however, of the Copernican theory was not made until Newton's physics was applied to Kepler's laws. But the great revolution in celestial physics had been ignited by Copernicus.

Whether Copernicus ever took priestly orders is problematical. His harmonious universe was certainly not in conflict with the Christian belief in an intelligent, creative God. After all, Aquinas had associated reason with theology. He had no compunction about dedicating *De Revolutionibus* to Pope Paul III. Nevertheless, the long delay in its publication is indicative of his fear that some Aristotelian theologians might be averse to his viewpoint. In the letter of dedication he wrote, "It may happen that certain exegesis, ignorant of mathematics, may feel privileged to pronounce judgment on my work by reasons of this or that scriptural passage twisted to this purpose. Should any such person criticize my meaning, I take no account of them." It so happened that the first theologian to attack it was Luther—on the basis of common sense. The first vigorous attack on Biblical grounds was by an astronomer, Tycho Brahe. The decentralizing of man was not a concern of either Copernicus or Galileo; in fact, one could commend it for making religion less anthropocentric and God less provincial.

Copernicus had worked for years on *De Revolutionibus Orbium Coelestium*, (Book I completed in 1519, the whole in 1530), based upon the Alphonsine Tables; he was finally persuaded to publish it by a young professor of mathematics from the Lutheran University of Wittenberg, who visited him in 1539. A year later this professor, Georg Joachim von Lauchen (Rhäticus, 1514–1576), published a summary of Copernicus' work, entitled *Narratio Prima de Libris Revolutionum*. Copernicus then entrusted his own manuscript to a fellow-member of the Cathedral Chapter, Tiedemann Giese, for its publication under Rhäticus' supervision in Nuremberg by the printer Johann Petrius. A printed copy was given to him on May 24, 1543, the day of his death. It is now commemorated by some Lutheran churches in the United States.

The opus had an unsigned introduction by a Lutheran mathematician of Nuremberg, Andreas Osiander (1498–1552), who had been entrusted with the supervision of its publication when Rhäticus went to Leipzig. This non-Catholic felt it necessary to qualify the radical model by insisting that any scientific hypothesis may be true or only probably or even false—purely a fiction "to save appearances"—not at all Copernicus's point of view!

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*Twentieth in a series by Raymond J. Seeger on scientists and their religion.*

# Book Reviews

**WOMEN IN SCIENCE** by Vivian Gornick. New York: Simon and Schuster, Inc., 1983. 165 pages; n.p.g.

Vivian Gornick, the author of *Women in Science*, is not a Christian. The book is not about Christianity, or directed toward a Christian readership. However, I believe the book deals with issues that every Christian scientist should consider. Gornick's original motive as a journalist active in feminism was to "document discrimination against women in science." In the process, however, Gornick also deals with topics such as why people engage in scientific research and the power structure of science itself. The discussion of this latter topic in particular should cause a Christian scientist to evaluate his or her beliefs and behavior.

Ms. Gornick carried out her study by interviewing about one hundred women involved in basic research who represented most of the major sub-disciplines, and whose ages ranged from 24 to 78 years. The study was not intended to be statistically rigorous or scientifically controlled, but rather was designed to discover on a personal or emotional level how women view themselves as scientists, and how this affects their psyches.

In part one, "Who Are These People, And What Do They Think They Are Doing?", the author describes, through excerpts from interviews, why people (women in particular) are attracted to a career in research. In an eloquent manner, Ms. Gornick communicates the special and addictive quality of the intellectual pursuit of ideas:

> . . . a scientist or a writer is one who ruminates continuously on the nature of physical or imaginative life, experiences repeated relief and excitement when the insight comes, and is endlessly attracted to working out the idea. (p. 40)

In part two, "Women in Science: Half In and Half Out," Gornick illustrates the current condition of women in the research professions. One recognizes immediately several stereotypes here: the "research associate" who, although every bit as capable as the next person, never received tenure or promotion; and the wife in the "professional marriage" who never received treatment equal to her husband. Other illustrations are given as well, which document the widespread discrimination to which women in science have been subjected. The author rightfully identifies a major factor which continues to act as an obstacle to women's rights: scientists (and male scientists in particular) who sincerely believe that they are totally rational and objective, and therefore incapable of discrimination. This attitude makes it particularly difficult to bring about change.

The final section, "Women in Science: Demystifying the Profession," is perhaps the most significant, especially to a Christian scientist. In fact, the issues discussed here should not, cannot, and must not be confined to women. Gornick describes in a very revealing fashion the power structures of science. Abuses of the tenure system for personal gain and the incredibly demoralizing exhaustion that often occurs in the "run" for tenure are examples. These problems affect all scientists, be they male or female, and point to the need for some changes. The other critical issue presented in this section deals directly with family life and social structure. The pressures placed on a woman by the expectations inherent in the current power structure make it difficult to have a family and to also succeed at one's profession. Some women have decided a family would be a detriment to their career, and yet many others feel that a family must be integral to their lifestyle and, indeed, their "wholeness." In her book, Gornick describes this ongoing debate from both sides. One conclusion she reaches is that the structure of science is changing even now, and that it *must* change so as to recognize that *every* scientist exists outside of the lab, and is a human being with normal needs for family, intimacy, and so on. This is a conclusion of monumental importance, and I contend that it directly affects men in science as well. The tacit, subliminal, and sometimes overt expectations at many large research-oriented universities place too much pressure on both women *and* men, and this has a detrimental effect on the "whole-person." As Christians, we must individually consider how we can make a difference in these power structures and social norms, and collectively we must present a Christ-centered, balanced approach to those activities labeled as science.

In summary, this book, while not directed at Christians, deals with issues which should be of interest to Christian scientists. It is well written, insightful, and should give one cause to consider his or her own attitudes.

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**GOD AND NATURE: Historical Essays on the Encounter Between Christianity and Science** by David C. Lindberg and Ronald L. Numbers (eds.). Berkeley: University of California Press, 1986. xi + 516 pages. $50.00 cloth/$17.95 paperback.

David C. Lindberg, Professor of the History of Science, and Ronald L. Numbers, Professor of the History of Medicine and the History of Science, both at the University of Wisconsin–Madison, have done a remarkable job in pulling together sixteen history authorities from this country, England, and France, to present a tour de force summary of the interaction between science and Christianity from the days of the early church to the present. The material is the outgrowth of an international conference on the historical relations of Christianity and Science, held at the University of Wisconsin–Madison in 1981. It focuses on a variety of inputs to the questions of whether science and Christianity have historically been in conflict, or whether they have really been allies, or whether in fact—as one is not surprised to learn in detail—the actual situation is far too complex to be described by any simple rubric.

The book has 18 chapters, each about 25 pages long and listing between 23 and 105 references per chapter, plus an 11-page Guide to Further Reading, short biographies of the authors, and a 27-page index. It is therefore a valuable resource for insight into the historical literature, as well as for summaries and interpretations of this literature by accredited scholars.

After an initial chapter by David Lindberg on "Science and the Early Church," subsequent chapters deal with the Middle Ages, the Copernicans, Galileo, Catholicism and early modern science, Reformation theology, Puritanism, studies based on Kepler, Descartes, Newton and Laplace, the mechanistic conception of life, earth history, geology and Genesis in the 19th century, the impact of Darwin and Darwinism, the Creationists (a chapter by editor Ronald L. Numbers), and reflections on modern physics and the modern interaction between Protestant theology and natural science. The authors strive for a thoroughly balanced picture, seeking in authentic professional discipline to avoid simplistic interpretations. Perhaps their very success in doing this sometimes poses a problem for the reader: How can any layperson unravel the actual historical interactions, in view of their overwhelming complexity, in order to learn as much from history as we would like? It appears that along with general overall changes in perspective, many specific interpretations shift back and forth between extreme positions, with both persisting in some form down through the centuries even into the present.

The comprehensiveness of the historical coverage sometimes leads to another problem, which is essentially unavoidable in a book with such great ambition: the reduction of major individuals and major concepts to a few lines. Perhaps this seemed to be more troublesome in the later chapters dealing with events closer to our own day, with which we are more familiar and hence more likely to recognize omissions of full detail. The attempt to cover in 25 pages the thoughts of Barth, Brunner, Bultmann, Tillich, the Niebuhrs, Neo-Orthodoxy, Mascall, Ramm, Gordon Clark, Donald MacKay, Whitehead, and Hartshorne is bound to leave the reader with only the barest glimpse into these men and their thoughts. For example, the brief comment on MacKay's view of complementarity as a way of relating science and Christianity—that complementarity does not "by itself, answer the questions about how science and theology are related" (p. 465)—is a rather rapid dismissal of a powerful, interpretive perspective. Perhaps one of the positive results of the book will be the impetus it provides the reader to fill out areas of particular interest, once he has been made aware of them.

The common dictum that people ignorant of history are doomed to repeat its mistakes is nowhere more cogent than in the area of the interaction between science and Christianity. The historical views set forth in this book shed a great deal of light on present day controversies, and provide insights as to the authentic issues and the most promising ways of resolving them, both by recognizing their complexities and sometimes in spite of them. It is somehow refreshing to realize that in the early 5th century Augustine (as described by Aquinas some 800 years later) was insisting upon the hermeneutical principle that "no particular explanation should be held to rigidly that, if convincing arguments show it to be false, anyone dare to insist that it still is the definitive sense of the text. Otherwise unbelievers will scorn Sacred Scripture, and the way to faith will be closed to them" (p. 63). If Christians could learn from that single thought, how great would be the contribution to Christian witness.

This book is essential reading for anyone seriously concerned about the interaction between science and Christianity. Students who are introduced to it early will find it a tremendous help in integrating their own faith and life.

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*This review was prepared initially for* Fides et Historia, *Journal of the Conference of Faith and History.*

**THEOLOGIES OF THE BODY: Humanist and Christian** by Benedict M. Ashley, O.P. The Pope John Center (1985). 770 pages. Paperback; n.p.g.

In his foreward the author, a Dominican Thomistic theologian, apologizes for presenting material from some fields, in which he obviously lacks expertise, in his desire to present a "broader synthetic purpose." Unfortunately, his selection of data is invariably done uncritically from a narrow, subjective viewpoint. The announced theme is "Can We Create Ourselves?," and the answer is given in the concluding chapter: "Humanists and Marxists say yes . . . modern science and technology have made this a real possibility . . . the Christian answer is also yes."

Part I deals with "Science, the Body and the Humanist Theology." "Science has taught us . . . we have evolved from star dust." The author not only neglects to define science, but carelessly uses the same word for all knowledge throughout the ages—regardless of the phenomena or methodology. Our only clue is that he himself prefers Aristotelian epistemology and the dictum that "science is knowledge of the universals." Nor is it helpful to follow Aquinas's argument that theology is a science. It is difficult to understand precisely what the author means by his casual use of the terms moral science, scientific facts, scientific truth, positive science, positive theology,or positivistic materialism.

It is not surprising to find a philosophy-minded theologian subscribing to the historian-philosopher school that regards the fourteenth century as the renascence of science in the Paris-Oxford schools. Here one finds a glorification of the revived Pythagoras-Plato tradition culminating in the mathematization of science. Begrudgingly, the young Galileo is regarded by the author as having participated in the revision of Aristotelian physics. In grouping together Copernicus, Brahe, and Kepler, Ashley reveals his own lack of appreciation of observations per se—the genius of the modern scientific method. Nor is his understanding of Newton any better when he extolls him as one of the first theologians of deism.

The author appears particularly gullible with respect to modern scientific theories, many of which are merely interesting speculations. A favorite phrase is "matter and energy;" I believe he means matter and radiation. He is apparently not familiar with mathematical invariance or physical conservation laws. I doubt if he understands the meaning of $E = mc^2$, which he cites. I cannot agree with the author's opinion that "modern science no longer claims to predict the future of natural events"—true only of particles under certain conditions—or that"natural laws are statistical only."

Part II is entitled "Christian Theologies of the Body." While subscribing to P. Tillich's definition of religion as dealing with matters of "ultimate concern," the author manages to include a diversity of subjects including humanism, secular religion, and so forth. He does not simplify matters when he uses the terms "philosophical" and "theological" interchangeably in making comparisons. For example, he speaks of the "theologies of humanism." He speaks also of "the scientific culture of facts and the more humanistic culture of values." He insists, wrongly, I believe, that science is value free. Inasmuch as the book has been published by Nihil Obstat and Imprimatur, the opinions expressed in this area have at least been reviewed by some Catholic theologians.

I was interested to learn of the general Catholic acceptance of the critical-historical method for interpreting the Scriptures. I did not realize, however, that inspiration is believed to

comprehend the Bible as a whole, not necessarily individual pieces. As a Lutheran, I noted particularly the apology for various Catholic pronouncements, as well as incidental opinions about Protestantism. Although I have always had a high regard for the Jewish maiden Mary, I was astounded at the accelerated growth of Mariology, Immaculate Conception, Assumption, Mother of God, Mother of the Church. I cannot accept the author's view of Jesus and Mary as "brother and sister." I do not believe that "the presence of God in the human world could not have been merely through the man Jesus, but required also a woman, Mary."

Part III, "A Radical Process Interpretation of Science," and Part IV, "A Process Theology of the Body," are complementary. In particular, he discusses the spiritual body. As a strict Aristotelian, he opposes Plato's dualism of the real and of the actual, that is, the soul imprisoned in the body. For the human self is "a body whose form is the soul." Disembodied spirits are the subject of angelology. Apparently, the less information in the Scriptures on this subject and on resurrected bodies, the greater the opportunity of a theologian to speculate. I am amazed that the author confesses to take seriously without any evidence "the popular belief of many primitive people that some of the dead linger about the places in which they lived and others move more freely." The author likens some of the lacunae in these views to the empty places in Mendelejeff's Periodic Table of the elements. I do wonder, however, that even a theologian could possibly believe that the history of evolution has reflected the civil war among the cosmic intelligences.

One of the most interesting chapters is on "God's Fullness in Bodily Form." Here the author considers the human body of Christ and the Church as the Body of Christ, concluding with the Mother of God. The spiritual body of the wounded Christ and of the resurrected Christ, and the glorified body are discussed as they relate to the current metaphysical problem of the Eucharist Celebration.

The final chapter is entitled "The Godliness of Matter," in that matter by its infinite potentiality allows for the infinite creativity of God. The human body is "God's Image" and "God's Glory." Protestants, however, will tremble to find the book conclude with Revelation 21:1–4, interpreted as here foretelling Mary as "the Church, the beginning of the reign of God."

A few footnotes! One is impressed with the vast reading associated with the 14 chapters; the almost 1300 notes (157 pp.) are generally explanatory. The index of names is lengthy, but does not always indicate more than casual asquaintance—if even that. (The reader would appreciate more consistency with respect to full names and years of *both* birth and death.) Throughout the book many undefined terms are apt to puzzle the "average reader;" for instance, electromagnetic charge, economic Trinity, ontological Trinity, scientistic humanism, cultural scientist, and so on. It might be helpful if a calendar of significant periods and events were included. More careful proof reading might have detected glaring errors such as Pope Paschal in the Name Index for Blaise Paschal in the text. I believe the purpose of the book might have been better achieved if more attention had been given strictly to it per se and less to more broadly related matters. Too encyclopedic!

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**A HISTORY OF MODERN PSYCHOLOGY** by Duane P. Schultz and Sydney Ellen Schultz. New York: Hartcourt, Brace, Jovanovich, 1987 (3rd ed.). 403 pages. Hardcover; $31.95.

Psychology is among the oldest scholarly disciplines in existence today. Ever since the Garden of Eden, people have been fascinated by behavior and speculated on its causes. Early in mankind's history, the speculation was done by philosophers and theologians. However, Schultz and Schultz show that the problems considered in antiquity (memory, learning, perception, irrational behavior) were psychological in nature and are the same ones which continue to occupy the attention of the psychological community today.

In this volume, the twists and turns on the path to modern psychology are expertly set down by Schultz and Schultz. This book is a fascinating account of the growth of psychology through the friction provided by conflicting schools of thought. Each school served as a foil for the emergence of an antagonist: structuralism, functionalism, behaviorism, Gestalt, and psychoanalysis.

While Schultz and Schultz trace the origins of psychology to antiquity, they do not begin their history of psychology with Socrates, Plato and Aristotle. Indeed, as the authors of this volume point out, while psychology is one of the oldest disciplines, it is also one of the newest. This paradox is illustrated by Hermann Ebbinghaus' famous quote: "psychology has a long past but only a short history."

The long past goes back at least to the emergence of Greek civilization; the "Greek miracle," as it is frequently and appropriately called. But the history of experimental psychology is a short one; it began in 1879 in Germany with a genius named Wilhelm Wundt when he set in motion the first experimental psychology laboratory. Thus, the centennial of the birth of modern psychology was just recently celebrated in 1979.

According to the authors, the distinction between the psychology which Wundt originated and its predecessors relates to the methods used, rather than the questions explored. Wundt used the tools and methods of modern science, especially the experiment, rather than relying solely on intuition, speculation and logic. Wundt not only started experimental psychology; he also initiated its first journal to preserve its findings.

An interesting feature in this book is its attempt to correct the myths and legends concerning Wundt that have been taught. The authors admit that the previous editions of this book "have been compounding and reinforcing the error under the imprimatur of their alleged expertise" (p. 59). This illustrates that while history does not change, the interpretation of it does. The authors are to be commended for candor in admitting their error.

Schultz and Schultz emphasize the important role the United States has played in the development of modern psychology. Although experimental psychology was born in Germany, it quickly found its most fruitful soil for growth in America. Just eight years after experimental psychology's birth, the first psychology journal in the United States was published. That was followed a year later by the appointment of the first professor of psychology in the world at the University of Pennsylvania.

During the fifteen years following the start of modern psychology, 26 psychology labs were opened in the United States. In 1892, the American Psychological Association (APA) was formed. Today more than half of the psychologists in the world live in the United States and 61,000 of them are members of the APA.

This book pays tribute to the eminent historian of psychology, E.G. Boring, by references to his classic volume, *A History of Experimental Psychology* (1929). In addition, Edna Heibreder's *Seven Psychologies* (1933) was also used as a reference by Schultz and Schultz. Both of these books are indispensable to the reader who desires to know more about the people and thoughts that provide the foundation for modern psychology.

This book appeals to several audiences. For those interested in the history of science, Schultz and Schultz provide a succinct thread upon which to trace the flow of ideas and their impact on the fledgling field of psychology. For those who work in the field of psychology, this book can provide a quick review of the contributions to science of their intellectual ancestors. For those who teach a history of psychology, this would make a wonderful choice as a text for undergraduate courses. And for scientists in any discipline, this book offers an interesting account of one of the most popular disciplines in contemporary science.

Christians in the scientific community will find this book stimulating, as it contrasts the theological and scientific approaches. For instance, Rene Descartes, the bridge from the Renaissance to the modern era of science, is viewed as the one who "freed inquiry from the rigid theological and traditional dogmas that had controlled it for centuries" (p. 22). It is noteworthy that Descartes was trained in a Jesuit college. Schultz and Schultz indicate that many other early scientists and psychologists were reared in Christian environments including George Berkeley, James Mill, Ernest Weber, Gustav Fechner, and Wilhem Wundt.

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**POVERTY AND WEALTH: The Christian Debate Over Capitalism** by Ronald H. Nash. Westchester, Illinois: Crossway Books, 1986. 223 pages. Paperback; $8.95.

This book is both readable and enjoyable. It is written for the Christian layman who lacks expertise in economics but who wishes to be better informed in his thinking about our economic system. It is especially helpful for those who ask, "Can I, as a Christian with compassion for the poor, be committed to the capitalist system?" The author's answer is a resounding "Yes!" Nash lays to rest the assumption that to accept socialism is somehow to be more just, compassionate and Christian. The work is sufficiently lively in style to invite one to persist to the last page with a minimum of effort.

The author's previous writings include, *Social Justice and the Christian Church*, and *Freedom, Justice and the State*. The present work is a defense of capitalism as a system that contributes to social justice and is efficient in its operation. Nash believes that many evangelicals, in their compassion and concern for the disadvantaged in the United States and abroad, have mistakenly espoused interventionist or socialist schemes that do not produce the social benefits desired. Good intentions wedded to unsound economic theory often lead to negative rather than the intended positive results. Nash pronounces the well-intentioned programs of liberals and socialists a flat failure. He argues that the only effective means for providing the greatest good for all is to return to a *laissez-faire* system. All central planning and government intervention in the economy must be abandoned if the economic machine is to run smoothly. Concerned Christians need to get a firmer grip on the basic principles of economics if they are going to ameliorate suffering. When Nash talks about basic economic principles, he seems to be thinking in terms of classical economics, or the free market emphasis of economists like the University of Chicago's Milton Friedman.

At the outset, the author attempts to provide a mini-course in basic economic ideas, explaining such things as the distinction between macroeconomics and microeconomics and the role of scarcity in economic theory. In a chapter on the free market system, he defends the market as a spontaneously operating mechanism that satisfies the innumerable and constantly shifting needs of buyers and sellers, without the need for central planning or direction. In two chapters on capitalism, he asserts that this system should be accepted by the thinking Christian as one that is morally superior to socialism. Nash does not presume to argue that there exists a Christian or biblical system of economics. He does assert that the efficient operation of the capitalist system and its respect for liberty makes it more capable of meeting the expectations of Christians; that an economic system must provide a decent life for all segments of society, and that it do so while upholding human freedom and dignity.

A chapter on socialism concludes that the system is unworkable. Similarly, Nash decries the present mixed economy of the United States, which he classifies as interventionist. He does not see the American example as a paradigm for capitalism, but as an untenable middle ground between socialism and true capitalism. There are also chapters on Christianity and Marxism, liberation theology, the Great

Depression (which he blames, surprisingly, on Hoover for being an interventionist), social security, money, and on the problem of poverty in America and the Third World.

This book is a well-reasoned response to the tendency of some evangelicals whose concern for social justice has led them to flirt with forms of socialism or Marxism. Many Christians who are moderate or conservative in their economic and political outlook will find in this book intellectual justification for their views. As well, many will also agree with the call for more careful study of economic principles before espousing social-help crusades that might be ill-conceived, or even leave the poor in a more dependent and helpless situation than before. But many moderates, not to mention liberals, will find Nash's call for a return to a *laissez-faire* system, a call to revert to a system that desperately needs reform. It is difficult to conceive of a return to the unbridled system of the 1800's. If the government were to keep its hands off the economy, serious crises would be inevitable. What check would an unrestrained market system have on the tendency of profit-seeking competitive corporations to pollute the air, land and water resources of the nation? What historian, remembering the unbridled greed of the robber barons of the last century, would like to see railroads and other monopolies choking out competition and charging extortionate rates? It could be argued that the American experience of the 19th century demonstrated that the free market system works best with a moderate amount of regulation and intervention. Without government as an umpire, the powerful corporations would as soon destroy competition and enjoy a predictable and controlled economy (one controlled by them). Since Nash argues that there is no viable middle ground between socialism and *laissez-faire* capitalism, those who believe in a market system with some modification will feel that he has attempted to cut the ground from beneath them. Whatever one's views, this is a book that is lucid, helpful, and provocative.

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**IS CAPITALISM CHRISTIAN?** by Franky Schaeffer (ed.). Westchester, Illinois: Crossway Books, 1985. 461 pages. Paperback; $9.95.

This book is an anthology of essays on subjects which relate to the ethical aspects of competing economic systems. Each of twenty-one authors has contributed an article and, although the emphases are diverse, all expositions are written from a conservative political-economic viewpoint.

A more accurate, if more verbose, title would have been, "Are Capitalism and Christianity Compatible?" Nevertheless, it is recognized that not all capitalists are Christians, and no economic system in this world will be faultless. This point is not belabored. None of the contributors go into a discussion of Rev. 18, or Ezek. 27, or other passages pertaining to potential or real commercial corruption; these are seldom cited by liberation theologians anyway. The emphasis is on the material and spiritual superiority of capitalism over all forms of socialism as reflected in 20th century history, and in particular, opposition to leftist economic leanings outside and inside the Church. The jury's decision is unanimous: the capitalist system should be defended and appreciated, and socialism's failures should be squarely faced.

Although in his introductory chapter Schaeffer does not explicitly say so, the cumulative evidence is so great that one leaves the book with an impression of massive hypocrisy on the part of the leftists, whether Christian or otherwise. I, for one, would like to see what kind of rebuttal the liberals can produce, if they choose to do so at all!

Schaeffer has divided his book into parts containing essays on similar themes. These sectional topics may be paraphrased as follows: (I.) How free enterprise produces prosperity. (II.) The socialist experiment in the Third World. (III.) Impact of socialist ideas in the U.S. (IV.) What the modern doomsdayers overlooked. (V.) Liberation theology debunked. (VI.) Appendices.

Like Clark Pinnock, professor of theology at McMaster Divinity College and a contributor to this work, I had been attracted by radical leftist ideas before moving to a more conservative stance. From my current perspective, there is little in this anthology to argue with and considerable detail worth revealing.

Warren T. Brookes, writer of the weekly column, "The Economy in Mind," is the author of an essay in Part I. He notes, " . . . religion, which is the teaching and promulgation of values, is intimately connected to the economy." "Redistribution has replaced contribution as the dominant theme." He also documents a recent steep decline of belief in God's existence in democratically socialist nations: " . . . capitalism thrives on the political and religious freedom also essential to Christianity."

In the next section, Paul Johnson writes a most interesting revisionist history (1945–1962) on the emerging identity of selected Third World nations. P.T. Bauer, of the London School of Economics, shows that conditions in the Third World should not provoke guilt in the West. In particular, those nations with greater economic contact with the West have been experiencing greater advancement. Humberto Belli, a former Sandinista, relates the recent events in Nicaragua as far from explainable merely as reaction against real or imagined capitalist greed.

The next division deals with the impact of socialist ideas within the U.S. itself. The feminist concept of "comparable worth," for example, is a clear departure from *laissez-faire* capitalism. Michael Levin exposes the philosophical problems associated with comparable worth, not the least of which is the absence of hard criteria for determining worth, apart from market forces. Thomas Sewell, a Hoover Institution Senior Fellow who is black, contrasts rights vs. quotas and equal opportunity vs. equal results. He points out that there are several factors confounded with race, such as age, educational pursuit, geography, and culture. Part III is concluded

by a lengthy article detailing the utopian bias of the media and its highly selective reporting.

Projections of doom within the next generation or two have been a recent staple of the liberals. Two essays in the fourth section discuss the demographic fallacies associated with such predictions. It may be added that the earlier models of disaster had made projections even for the mid-1980's, which now seem quaintly pessimistic. Even so, the *Global 2000 Report*, casting a similar pall over the future, was compiled as recently as the Carter administration. A masterful rebuttal by Simon and Kahn, which should have been included in this section, appears instead in the appendices.

Part V is appropriately titled, "Liberating the Church from Marxism." The opening salvo is Dale Vree's critique of Gustavo Gutierrez, a Peruvian and a leading liberation theologian. This is followed by Neuhaus's history of the capitulation of much of Protestantism to modernist economic thought; a key essay, since a reversal of this is evidently a major goal of Schaeffer. One of my favorite works is that of economist P.T. Bauer on the legitimization of envy. Some of the socialist documents he quotes originated in the prestigious Vatican. They all seem to ignore the variety of causes of poverty. On the other hand, he cites Bishop Bududira, an African, who perceives that tribalism and local Third World cultures actually obstruct material progress. In the final selection, by Lloyd Billingsley, the concept of "compassion" is addressed. It is pointed out that the compassion of radical Christians is directed only toward the "interesting" poor, namely those who are actively anti-Western.

Some essays have been relegated to an Appendices section, but the quality of these is every bit as good as the rest. For example, Peter L. Berger examines the reasons for the recent economic success or failure of several nations. Nick Eberstadt provides information on disaster management in developed and underdeveloped nations, as well as foreign aid and its effects, including the phenomenon of investment without growth. In poor countries, "rates of gross domestic investment are higher today than they ever were in the United States."

In short, this anthology not only provides a staunch defense of Western capitalism, but makes it clear that Third World countries must disavow socialism if they are to have real hope for economic and industrial modernization. Schaeffer has compiled a wealth of information and observation which should be extremely valuable for any of us involved with debating the apologists for utopianism. No nation has yet fashioned an economic system more compatible with Christian freedom and productivity than capitalism.

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**ANTHROPOLOGICAL INSIGHTS FOR MISSIONARIES** by Paul G. Hiebert. Grand Rapids, MI: Baker Book House, 1985. n.p.g.

Cultural anthropology and theology present two views of the world. These are based upon two different perspectives, and often seem to be irreconcilable. Theologians might argue that Christ is above culture. The anthropologist might counter by saying that Christ has come to us in a specific "cultural package." One argues for the primacy of a theological viewpoint, and the other argues for the necessity of being grounded in an understanding of culture and society. Even if we are able to move past this basic level of discussion to a consideration of contextualization, we still find major questions remaining as to how this might be done. How do we keep from contextualizing the Gospel message and still keep theology from being put at the service of anthropology?

These are hard questions.

At a more practical level for the cross-cultural missionary, how do we work cross-culturally without either collapsing under culture shock, or flailing our host with truisms from our own cultures? How do we live in a new society and in the midst of a different culture, attempt to communicate about the most subtle yet most basic aspects of life, keep family and health intact, relate to the "folks" back home, and then eventually return to our original societies and cultures only to find that we are now the marginalized persons who are truly "betwixt and between"?

These, again, are hard questions.

Dr. Paul Hiebert of the School of World Mission at Fuller Theological Seminary has provided us with a masterful tool which, although not making these questions any less difficult, at least affirms their importance, that answers can be sought, and that we will come out of this process in one piece. He provides a sound treatment both of culture and the Gospel which denies the complexity of neither. He treats the task of living in another culture with much practical wisdom and a good deal of intellectual sophistication. He presents a thoroughly sound and persuasive approach to contextualization and the communication of the Gospel, which not only will be helpful to the cross-cultural missionary, but also the rest of us living "here at home" while we attempt to witness to our non-Christian co-workers, neighbors, and friends. Lastly, he brings us into the current world scene by describing the "Bi-cultural Community" as that community which is working at the integration of faith and culture. Here, we see clearly that we can no longer live under the illusion of going to pristine societies, which are unaffected either by external events or by our presence and the message we bring.

This is all done in clear, non-jargony language. Effective charts and diagrams sprinkle the text and go a long way towards illustrating difficult concepts and ideas. Dr. Hiebert is an analyst and a storyteller. He is an intellectual and a missionary, clearly displaying his many years in India—first as an MK, later as a missionary with the Mennonites.

This book is believable, convincing, and practical. I would recommend it for anyone involved in cross-cultural work, attempting to understand the Gospel in an integrated sense as impacted by cultural and social forces, or considering being part of the mission enterprise. It would be useful for courses in

applied anthropology, missiology and missionary preparation, and the theory of culture.

*Reviewed by Harley Schreck, World Vision International, Monrovia, CA 91016.*



**THE RELIGIOUS FACTOR IN AUSTRALIAN LIFE** by Gary D. Bouma and Beverly R. Dixon. Melbourne: "MARC Australia" and ZADOK Centre for Christianity in Society, 1986. n.p.g.

Utilizing data gathered in 1983 by the Morgan Gallup Pollsters, Bouma and Dixon have examined various aspects of Australian religious life and the influence of religion on Australian society and behavior. This is a valuable work. It has long been assumed that Australia is "post-Christian." This study goes some distance toward convincing us that Australia is not a secular society, and that religion still plays a major role in the way people think and behave.

Grouping the respondents into five categories—Roman Catholics, Anglicans, mainline Protestants, Evangelical/Fundamentalists (interestingly labeled "Right-wing Protestants," requiring a bit of cultural translation for this American reviewer), and the nonreligious—the authors found that there are clear differences which could almost denote five subcultures. Significant differences were found in attitudes on morality, tolerance for other races, ethnicities, followers of other lifestyles, evaluations of social change, political stances, and so forth.

Surprises abound. 57.9% of Australians claim to be religious, yet 85.6% identify with some religious group. The nonreligious are the most intolerant and the "Right-wing Protestants" are most tolerant of ethnic and racial differences. Denominational differences had a clear association with a number of social issues. These and other findings have implications for ministry and evangelism.

For example, there is a substantial difference between all the religious sub-groups and the nonreligious. This would suggest that we have a situation where the religious are largely irrelevant to, and often speak past, the nonreligious. This offers precious little hope of effective evangelism. Yet, all Australians value family very highly. Could not a recognition of this fact, and a redirecting of ministry and outreach in response to this, result in substantial success for evangelistic efforts among the nonreligious?

Yet, a study like this raises more questions than it answers. The survey questions often seem problematical in terms of measuring substantial values or behaviors. Measurement aside, the survey cries out for the richness of conversation, questioning, contacts. It does its best in getting into the issues, but leaves us hungry for substance. Hopefully, the next step will be a core of researchers and practitioners who will search for answers of more depth and strive to find better ways to minister to the heart and soul of Australia.

This book is recommended for those who are interested in the study of religion in modern life. It would best be used in conjunction with ethnographies of urban, industrialized society.

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**LIVING IN THE SHADOW OF THE SECOND COMING: American Premillennialism 1875–1982 (enlarged edition)** by Timothy P. Weber. Academie Books, Grand Rapids, Michigan (1983). 305 pages. Paperback; out of print since late 1985.

This work is a triumph and a tragedy. It is a tragedy that it went so quickly out of print, for Weber has written an outstanding work of history; one which triumphs over the typical difficulties authors have with fundamentalist controversy, and which is written with skill and flair. Rather than recapitulating theological controversies and the ebb and flow of doctrine, Weber examines how the beliefs of fundamentalists have influenced their behavior.

In this regard, Weber acknowledges the perspective offered by Robert F. Berkhofer, Jr., in *A Behavioral Approach to Historical Analysis* (New York Free Press, 1969), which states:"By concentrating on what people actually did . . . the historian can better evaluate what [they said or] thought they were doing. He can discover the true beliefs of individuals and groups. What people *do* frequently speaks louder and is more revealing than anything they *say*, or *claim to believe*" (p. 7, emphasis Weber's). He observes that this approach is particularly helpful to the student of Christian history, for "Christians . . . have always been expected to live out the implications of their faith."

Thus, we do not see an examination of the different exegetical presuppositions of various premillennialists, nor do we see much of the personal and intellectual conflict that has troubled the emergence and development of fundamentalism. Instead, we are given a clear and objective view of how premillennialists behaved in their world.

The feature of this work that impressed me the most is its emotional maturity. Weber treats all the characters he encounters with altruism and respect, never descending to sarcasm or ridicule. He writes "non-judgmentally," allowing the reader to make his or her own value judgments. Kindness

notwithstanding, he never hesitates to discuss negative issues or regrettable behavior. But in doing so, he remains emotionally neutral. The book is full of subtle wit, always good-humored—I was repeatedly surprised and pleased by Weber's fairness and restraint.

The work is scholarly. It began as a Ph.D. thesis at the Divinity School of the University of Chicago under Martin Marty—34 pages of notes and a 23-page bibliography attest to that heritage. Weber's reading has been encyclopedic—the notes and bibliography provide an excellent entry to the extensive literature of American premillennialism. Although he covers primarily American authors, he does not neglect the important British ones.

He also writes objectively. It is a tribute to his even-handedness that I could not discern whether Weber is a believer, nor his doctrinal stance. But it is obvious from the first chapter, a summary of premillennial doctrines and their origins, that the author has come from "within" premillennialism. No one from outside the "circle" could possibly have such thorough knowledge of both the literature and the behavior of premillennialists.

In the body of his work, Weber first outlines the doctrines, in extremely simple form, that comprise premillennialism and its origins. He then discusses how the doctrine of the "any-moment Coming" affected actual practices and how the "now/not-yet" tensions were overcome. This teaching, interestingly, seems to have energized the preaching of the Gospel (to beat the deadline, as it were) rather than enervating it. Premillennialists also faced tension over social reform, teaching that the moral decline of humanity is inevitable, but not wishing to neglect needs that they saw. Weber's chapter on this problem is particularly interesting.

The world wars and the modern Middle East conflict have been important in the growth of premillennialism, and Weber devotes several chapters to the doctrinal issues that have been involved and to the resulting response of premillennialists. He also treats at length the attitude of premillennialists toward Jews in respect to Zionism, Nazi persecution, Jewish evangelism, and current relations of the Western powers with Israel.

The last portion of the book deals with recent Second-Coming prophetic works and the current Middle East situation, in which he points out several problems that beset premillennialists in their tendency to over-predict and over-interpret Scripture. He also indicates the developing difficulties which are being seen in those who combine fundamentalism and rightist politics, but this concern is of such contemporary interest that historical discussion is premature and Weber avoids it.

It is regrettable that this book has been taken from print. It is very well written: easily read, interesting, and stimulating. Its scholarship make it the best historical work on American premillennialism to date, one that will be a standard reference for years. Unfortunately, it is just too substantial for the "popular Christian" market.

*Reviewed by Daniel Johnson, Memomie, Wisconsin.*

**BEYOND CHOICE: The Abortion Story No One is Telling** by Don Baker. Multnomah Press, Portland, Oregon (1985). 96 pages; n.p.g.

In 1973, the Supreme Court made the decision that abortion was legal in all fifty states. Since this time, many people have debated the issues of the acceptability of abortion. Some people are pro-life; some people are pro-choice.

Don Baker presents a poignant picture of one person's experience with abortion. To me, this was very reminiscent of F. Schaeffer and C. E. Koop's book and films, *Whatever Happened to the Human Race?* Baker emphasizes the lack of choice and knowledge Debbie had when forced to make her decisions. I struggled with anger as I read the discussion during the counseling session for Debbie's first abortion. She was told it was "simply gettting rid of some unwanted fetal matter just as [a person] would get rid of some phlegm from their throat or mucous from their nose" (p. 25). It was never shared with Debbie that some people are very concerned for life, because God made us in His image.

Debbie was also told that the "little blob . . . has practically no resemblance to anything human whatever and is no bigger than a peanut" (p. 26). Later, when Debbie read Jimmy Swaggart's message, "America's Greatest Crime," she became aware that her abortions involved babies, not a fetus or an impersonal "blob" as she had been told. Even though Debbie communicated to the counselor that the abortion was being performed because of parental pressure, no one heard her and recognized the need to clarify her confused thinking.

That first abortion was the beginning of a downward spiral which gained momentum as the descent proceeded. You become involved in her feelings of abandonment, loneliness, guilt, shame, grief, sadness and depression as she allows two more abortions to be performed. You read of her struggles as she first abandons her daughter, Jennifer, and then tries unsuccessfully to regain custody. You empathize with Debbie and Steve as they seek for reasons why Debbie cannot get pregnant. Debbie has become a Christian, is married to Steve, seeks professional help on fertility, yet is unable to conceive. Why? She never had trouble conceiving before. Debbie continually questions whether this is the result of her abortions.

Baker concludes his book with Debbie realizing her need of God's forgiveness as she accepts responsibility for the behavior which led to the first abortion. Her problems are not solved—scars remain, but Debbie is using her experiences to help others in need.

*Reviewed by Emily Egbert, Lebanon, Pennsylvania.*

**ORDINARY CHRISTIANS IN A HIGH-TECH WORLD** by Robert Slocum. Word Books, 1986. Paperback; n.p.g.

When I requested this book, I expected a work that would in some way relate high-technology to Christianity. I expected chapters that would speak of the mechanization and computerization of society, the relationship between faith and technology, and perhaps a chapter on how ordinary Christians could make use of high-tech in the cause of Christ. The author's background in lasers, satellites, and other high-tech areas made this the likely content, or so I thought.

This book has little or nothing to say on the topics I imagined. Only one brief chapter (the first) comes close, in which Alvin Toffler's book *The Third Wave* is briefly considered. Slocum contrasts three general kinds of churches, each corresponding with the three "waves," then describes the six characteristics distinguishing the second and third "waves" as well as their church correlates.

At this point, the book turns to the topic of what the church is to be about. The author emphasizes lay ministry, as he does throughout the book—he even warns clergy not to read the book unless accompanied by a lay person! A second key emphasis here, again maintained throughout the work, is the need for small groups in the church. With both of these emphases, Slocum maintains that the only path to survival for the church is for the laity to be involved, particularly outside of the institutional church context.

After the two introductory chapters, the book takes a devotional turn. Slocum spends six chapters describing the heart. Attempting to be fully biblical, "heart," as he defines it here, goes far beyond the modern understanding of the word to include the intellect as well as the emotions, and the volitional aspect of human nature.

The third section attempts to apply this understanding of the heart to the practical situations of work, marriage and family, government, and the church. A number of practical suggestions are made in these areas. I expected some comment on how high-technology could be used profitably in these situations, but this does not seem to have occurred to the author.

I had a hard time relating his applications to the previous section of the book. The illustrations and ideas, while having considerable merit, are not well linked to his ideas on the heart. Indeed, there is little linkage of any kind between the different sections of the book other than his ideas regarding lay ministry and small groups, and these are only peripheral to many of his comments. In other words, the book is not well integrated and the schema is sometimes fragmented.

I cannot get away from the feeling that the phrase "high-tech" is only superficially added to the ideas in this book. The ideas Slocum suggests have merit, but I suspect the word "today" could have been substituted for the phrase "high-tech," and it could have been marketed as a devotional book that also encourages the use of small groups and laity involvement. There are a few small sections, such as chapter one, where the book *is* specifically oriented toward issues of high-technology, but these are indeed rare. Is "high-tech" used to give the book respectability and relevance? Or is it used to gain a male audience for these topics?

Another criticism is that, at times, the book is lightweight and general. Perhaps this is because Slocum expects it to be used as Sunday school curriculum. Of course there is nothing wrong with this, but I expected more when I read the title. It contrasts markedly with the more scholarly approach to high-technology and modern trends as they relate to Christian faith found in David McKenna's recent book *Megatruth*.

Again, I heartily endorse much of what Slocum has said here. While others have said many of these things better, Slocum may be able to reach the laity directly—his obvious intention. You may want to use this book in a Sunday school class, but be sure the members of the class know what they are going to study rather than relying on the title.

*Reviewed by Donald Ratcliff, Toccoa Falls College, Toccoa Falls, GA 30577.*

**A CALL TO EXCELLENCE: Understanding Excellence God's Way** by Gary Inrig. SP Publications (1985). 168 pages.

This book is based on the author's Doctor of Ministry dissertation at Dallas Theological Seminary. It obviously picks up on a term and an emphasis that is currently much in the public awareness. The term is not a label for a well defined doctrine, nor does the book pretend it is, but it does serve as a focus for drawing together a considerable body of practical Christian instruction.

The book begins by telling us that the believer "is called to excellence, to be the best that he can be for his Saviour"(12), and that excellence is not expertise but rather living as Christ lived. In this light, servanthood is the standard to meet. Ambition is a prerequisite for achieving excellence, which is not something that can be achieved but rather a direction of life—its pursuit. In this pursuit the believer must be selective—not all that can be done should be done. Biblical excellence is primarily concerned with character, which can ultimately produce a life that's practically useful and divinely approved.

Developing this character requires continual communion with God. This is a recurring theme: excellence isn't instantaneous and it requires work, even though the grace of God is what makes it possible at all. "The consistent teaching of the Word is that true excellence is grown and not conferred in immediate response to even the most earnest prayer" (75).

The closest thing to a definition appears just over halfway through the book, where we are told that excellence is "the maximum exercise of one's gifts and abilities within the range of responsibilities given by God" (87). There's a cost associated with this, a cost of commitment to obedience and routine faithfulness to divine responsibilities. There is a paradox here, because although personal effort is required it's not adequate. Excellence is not simply an individualistic effort. It's intended to be produced in the context of a

nurturing community—the church. And this requires effective leadership. Every believer has a unique contribution to make in the church and the body should expect excellence from each one.

There are several problems associated with biblical excellence. The first is a utilitarian view which wrongly connects the believer's pursuits with a guaranteed success. The second is a relativism that compares individuals to each other instead of to the divine standard. The third is an absolutism that creates an expectation of perfection attainable in this life. The fourth is a motivational perspective which differs from what the book teaches in that it is man-centered rather than God-centered.

Finally, achieving excellence is summarized as requiring discipline, direction and determination. "Because [God] has purposed that all His regenerated people be conformed to the image of His Son, growth in Christ-likeness is the essence of excellence in our present world" (161). This book is quite well written and very useful. I recommend it.

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

**THE MAJESTY OF MAN** by Ronald B. Allen. Multnomah Press, Portland, Oregon (1984). 221 pages. Cloth; $11.95.

Ronald B. Allen, a graduate of Dallas Theological Seminary, is a professor at Western Conservative Baptist Seminary. This is one of Multnomah Press's Critical Concern Books which seem to focus on important contemporary issues.

The book's twelve chapters fall into three categories: the mystery of man, the majesty of man, and a mandate for man. Helpful additions include subject and Scripture indices, an appendix and annotated bibliography. His chapter endnotes provide interesting and informative reading.

Allen seeks to reaffirm the dignity of man in this age of confusion. His observations are tied to the Psalmist's question "What is man?" which Allen considers the most pressing theological question of our day. (Allen uses the word "man" in a generic sense to refer to both male and female.) To this question Allen relates such topics as genetic manipulation, abortion, feminism, homosexuality, euthanasia, pornography, computer technology, nuclear weapons, and androgynous theism.

Allen wants the readers to "learn and to be true humanists, for humanism, rightly defined in Christ, is our divinely intended glory" (p. 13). Allen writes that secular humanism is an unfortunate coupling of ideas. This is because, to quote J. I. Packer, "it is only a thoroughgoing Christian who can ever have a right to that name." While Allen thinks secular humanism is a real threat, he contends that the controversy has been shrouded in overstatements and exaggerations which have led to pettiness and provincialism. Allen thinks that Christians who teach in public schools should not be made to feel guilty as though they were aiding the humanist conspiracy.

The contents of much of this book are warm and devotional. Allen believes that man as created in the image of God is majestic. By celebrating this majesty, man glorifies God. Allen has a sense of God's greatness and goodness, and his response is one of awe and gratitude. When critical issues are discussed, an irenic spirit prevails. Allen knows a lot about a lot of things and consequently his challenge is to the reader's head as well as his heart. This book would especially appeal to the neophyte, because the approach is reasoned and incremental.

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

**THE GOOD NEWS OF THE KINGDOM COMING: The Marriage of Evangelism and Social Responsibility** by J. Andrew Kirk. InterVarsity Press, Downers Grove, IL (1985). 164 pages. Paperback; $5.95. ISBN 0-87784-938-2. Previously published in England (1983) as *A New World Coming.*

Andrew Kirk's book is challenging and painful. It may be too much for many Christians. It hurts to have so many comfortable positions and practices (including our traditions as evangelicals) shaken so badly, but I believe that we can not ignore the issues that Kirk has addressed unless we are willing to ignore both the Scriptures and our Lord.

Kirk is associate director of the London Institute for Contemporary Christianity. His concern is the real gospel, not a caricature of it nor a partial gospel. And in addressing such, he does not pull his punches. He comes right to the point. "When it comes to convincing people that the gospel is true, the Church is its own worst enemy" (p. 118). He illustrates this repeatedly. He helps to penetrate the confusion about the impact of our culture and economic system upon many of our attitudes as Christians and upon our approaches to evangelism. His analysis addresses ideas held by evangelicals, liberals, and even Marxists. His diagnosis of these problems is compelling and lucid. Unfortunately, his prescription for solutions is less satisfying and not as convincing, although he has much to say that is enlightening and helpful. He has faced the issues head on and, consequently, is far ahead of most of us in this because we, especially the evangelical community, have been largely blind to them.

Kirk's emphasis is upon the kingdom of God. He shows it to be a central theme of the Scriptures and looks at what that means. His book deals with questions of justice, peace, poverty, evangelism, and the nature of the church. In this, he is looking for an authentic restatement of the Christian faith

which both adequately expresses the reality of the Christian life and does justice to all that God has shown of himself in Jesus Christ. While many Christians would concur with this objective, most whom I know are not ready to deal with it as seriously as Kirk does.

I am not sure that Kirk will get a fair reading from most evangelicals because his book contains such strong meat and he writes with such sympathy for a socialistic economic perspective. He even seems a bit pessimistic; as when, after showing how far our present approaches to ministry are from the teachings of the New Testament, he says "One is driven to the conclusion, therefore, that the present pattern of ministry is a sacred cow that cannot be touched" (p. 125).

As for myself, Kirk's book has made me despair. I have come to see far more clearly than before how far the Church is today from what the Scriptures reveal as God's intent for His Church. And I see no reasonable hope, apart from special Divine intervention, of significant movement toward what God would have the Church to be. I have reflected much since reading Kirk's book upon my experience as a Christian in a variety of congregations and upon my knowledge of church history and current Christian activities. I have concluded that we, that is, any sizeable group of Christians and not just the whole of Christendom, are not much different from the unredeemed people of our society in terms of attitudes or actions. And we seem unwilling to become real disciples of the One Whom we profess.

I would encourage Christian leaders to read this book and then to prayerfully seek God's guidance about changes needed in their lives and in the congregations which they influence.

*Reviewed by D. K. Pace, The Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland.*

**HANDLING CONFLICT: Taking the Tension Out of Difficult Relationships** by Gerry Rauch. Ann Arbor, MI: Servant Books, 1985. 149 pages. Paperback; n.p.g.

Gerry Rauch, an elder of a Christian community in Ann Arbor, draws upon his personal experience and Scriptural principles to give a Christian approach to solving problems between people. This book is one of three in a subset on "Overcoming Obstacles to Christian Living" in the *Living as a Christian* series.

Each chapter deals with a different Christian approach based on a Scriptural principle of handling conflicts in personal relationships. These different approaches depend on the type of conflict, ranging from chapters on "Matters of Clear Right and Wrong" to "Personal Preferences." Models are offered in chapters entitled "Imitating Christ" and "Men and Women of Peace." Other ways of handling conflict are described in the chapters "Using Forbearance," "Keeping Peace," "Separating If Necessary," "Speaking the Truth," and "Openly and Honestly Facing Conflict."

Written in anecdotal and conversational style, Rauch leaves the reader hanging on the outcome of an unresolved conflict at the end of each chapter, enticing the reader to continue to the next chapter which gives the solution using a different approach.

*Reviewed by Jerry Albert, Mercy Hospital and Medical Research Facility, San Diego, CA 92103.*

**PEACEFUL LIVING IN A STRESSFUL WORLD** by Ronald Hutchcraft. Thomas Nelson, Inc., Nashville, Tennessee (1985). 209 pages. $10.95.

Jesus has promised us, "Peace I leave with you, my peace I give unto you: not as the world gives, give I unto you" (John 14:27). Nevertheless, it appears that many Christians are gyrating in the turmoil of the world more than enjoying the peace of God. Hutchcraft, by his own testimony, was one of these, directing Youth for Christ and engaged in a host of speaking and writing activities. His success in obtaining experiential peace not only offers hope to many of us, but also guidelines for the attainment of this goal.

It is natural to think of peace in terms of the absence of the pressures, schedules, and trials of this world. As the author points out, God's ways are often different from human ways. Psalms 34:14 contains a key phrase: "... seek peace, and pursue it." In other words, peace will not just fall into one's lap: initiative must be exercised.

Once this thesis has been well established, Hutchcraft describes in considerable detail his four-point peace plan. First, there is a defensive strategy: a commitment to protect life's "quiet centers," which are facets of our relationship with the Lord. Next, the five roots of restlessness (or, as many as may exist in a reader's life) are to be removed. Third, one can mount an offensive against the stress centers, including strife, worry, and procrastinating activities. Finally, development of habits of peace serves to hold the conquered Promised Land.

The book is written with an entertaining style, liberally sprinkled with modern parables, anecdotes, and humor. However, one should take care not to be either euphoric or offended over the light language and thereby miss its considerable depth. Hutchcraft has thoroughly researched the Scriptures on the subject, and a great number of these are presented and discussed in the text. Undoubtedly there is further topical revelation knowledge that could be received (I. Cor. 13:12), but Hutchcraft's considerable progress, involving peace in spite of turbulent circumstances, deserves our

respect. I recommend this book to all who are willing to make the commitment to actively seek the Prince of Peace.

*Reviewed by Philip F. Rust, Associate Professor of Biometry, Medical University of South Carolina, Charleston, South Carolina 29425.*

**THE RETURN OF THE STAR OF BETHLEHEM** by Ken Boa and William Proctor. Zondervan (1985). 215 pages. Paperback; $7.95.

In the afterword, the authors—a Bible teacher and a professional writer, respectively—state: "The purpose in writing the book was not to produce a quasi-science fiction story or a theoretical theological thesis. We have been talking about the actual circumstances under which we live and the outline of events that Scripture assures us will occur in the future."

It is certainly not good science fiction, which requires good fiction in a framework of good science. Although it appears to be based strictly on Scripture, its theological fabrication relies too heavily on nebulous UFO's in an undefined multidimensional space.

The first part, "A Star in the East," relates Matthew's account of the visit of the Persian (?) Magi to Bethlehem about 4 B. C., and the tendency of the Star to disappear and appear without attracting any public attention, while yet locating precisely the Messiah. Part two, "What Was the Star?," discusses the nature of the star. Was it a meteor? A meteoric shower? A bolide? A bright star? A planet? A conjunction of planets? A comet? A nova? A UFO? A third class encounter with a visitor from outer space? (The authors are impressed by the current search for extraterrestrial intelligence, ETI.)

Fascinated by the mysterious relation of an $(n + 1)$ spatial object to n dimensional space, but carelessly ignoring the necessity for all dimensions to be essentially alike, the authors regard the Magi's Star as "an extradimensional entity guided by an apparent purpose that was unequivocally good." The Star, and other such unexplained UFO's, are claimed to be not antiscientific, but "actually beyond science." The authors, in fact, classify the Star as a "foreign object" (FO), which is the Hebrew *shekinah* and which belongs to the extradimensional "parallel" space we call heaven. The Star tells of God's presence and serves to guide His people.

Quite fanciful—if not mathematically correct. The argument is too ad hoc. It is not recommended reading.

*Reviewed by Raymond Seeger, Bethesda, Maryland.*

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*To matter in the scheme of the cosmos: this is better theology than all our sociology. It is, in fact, all that God has promised to us: that we matter. That he cares. As far as I know, no great prophet has promised people that God will give them social justice, though he may have threatened doom and extinction if the people themselves don't do something about it. If God cares about us, we have to care about each other.*

Madeleine L'Engle, *A Circle of Quiet*

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# Letters

## Mind vs. Brain: Two Dimensions of Reality?

I found the article, "The Mind-Brain Problem and Knowledge Representation in Artificial Intelligence" (*JASA*, 38, 4; Dec/86) to be helpful in my understanding of the distinctions between the mind and the brain. Mr. Feucht has found a very good parallel in the field of Artificial Intelligence (AI).

While the author's description of the mind-brain relationship was helpful, I was disappointed in his definition of the relationship. This definition consisted of two parts: ontological monism and epistemological dualism. Mr. Feucht found both categories necessary. A monistic approach is necessary because "the mind and brain are not assumed to be distinct structures with their own independent existences . . . ."[1] Mr. Feucht finds a need for an epistemologically dualistic approach because "both mental and physical repesentations of the mind-brain are necessary."[2]

But I wonder if what the author is talking about is monism after all. My understanding of the nature of monism is summed up quite well by Heaney. Monism emphasizes unity rather than diversity. "It has come since then to be used as well of theories of the human person which insist that it is a single thing rather than a composite of body, soul, spirit or other parts."[3] Mr. Feucht rightly resists a Neo-platonic division of the body, soul and spirit,[4] but he does admit to a division. "The distinction of epistemological dualism between mental and physical representations *does* [original emphasis] correspond to *a real distinction* [my emphasis] in the mind-brain itself."[5]

The author does not seem to take his own distinction between mind and brain seriously enough. He says, "When no distinction [at the same level of abstraction] is made, the representation is *monistic* [original emphasis]."[6] While it is true that the author claims the mind and the brain are two different levels of abstraction of the same object (the mind-brain), he still admits to a *real* distinction between the mind and the brain.

This points to a very real difficulty in attempting to define the mind-brain relationship in terms of monism and dualism. Michael Polanyi also speaks of various levels of reality, but chooses a different paradigm to define these levels. This paradigm would help extricate our thinking from the morass of Feucht's monistic-dualistic paradigm. As Drusilla Scott says,

> The long standing puzzle about man's mind and his body that Descartes left us cannot be solved either way [by emphasizing mind or matter]; it is a sort of philosophic Catch 22. Once the puzzle has been put in that form we beat to and fro without seeing any way out.[7]

Polanyi begins by claiming that "mind and body are profoundly different, they are not two aspects of the same thing."[8] For Polanyi, the mind dwells within the brain and the relationship between the mind (or person) and the brain (or body) is "a relationship not open to anyone else."[9] Polanyi's thought, at this point, is difficult to distill into a paragraph. Drusilla Scott's summary is helpful though. "The mind, then, can be described as the meaning of the brain, as a functioning whole can be seen as the meaning of its parts."[10]

Thus what we see in Polanyi is a duality of mind and brain. This duality is not dualism in a Cartesian sense or an epistemological dualism such as Feucht claims. Polanyi sees the mind and brain not as an epistemological dualism where mind and brain are two different levels of abstraction of the same thing (i.e., mind-brain), but rather as representative of two different levels of reality.

This idea of levels of reality provides the key for seeing the difference between Feucht and Polanyi. Marjorie Greene has given us a warning:

> We are so used to thinking, or thinking that we think, of the *real* [original emphasis] as the physico-chemical real; we are so used to apologizing for life and assuring ourselves that Nobel prizewinners are just on the verge of explaining it away . . . that to admit, *au fond*, to the reality of living nature seems a betrayal of science itself. What is real is by definition the non-living. That is the fundamental untruth we still have to overcome.[11]

Possibly Mr. Feucht has fallen prey to this misunderstanding of reality. He recognizes a real distinction between the mind and the brain, yet he defines those distinctions as different abstractions of reality. Implicit in this definition is a belief that reality exists only on one level. Every other level is an abstraction of reality. What Marjorie Greene wants to recover is an acceptance of a multi-leveled reality. This is not a Neo-platonic mind-matter distinction, but rather a distinction which better gets to the heart of the scriptural tradition. Body and soul cannot be separated. (As Polanyi would say, the mind dwells within the body.) On the other hand, the body and the soul are not identical; rather, they are two levels of reality.

With some minor alterations, Feucht's description of AI, and knowledge representation becomes a very helpful analogy to Polanyi's multi-layered reality without succumbing to the categories of Cartesian dualism. Unless we are able to break away from the Neo-platonic/Cartesion tradition, I believe we will continue to be swamped by the "contradictory" mind-brain data.

### *References*


[1]Dennis L. Feucht, "The Mind Brain-Problem," *Journal of the American Scientific Affiliation*, Vol. 38, No. 4, December 1986, p. 242.
[2]Ibid.
[3]James J. Heaney, "Monism," *Westminster Dictionary of Christian Theology*, ed. by Alan Richardson and John Bowden. Philadelphia: The Westminster Press, 1983.
[4]Feucht, p. 243.
[5]Ibid., p. 242.
[6]Ibid., p. 240.
[7]Drusilla Scott, *Everyman Revived*. Sussex, England: The Book Guild Ltd., 1985, p. 131.
[8]Ibid., p. 132. Quoting Polanyi and Harry Prosch, *Meaning*. Chicago: University Press, 1975, p. 51.
[9]Ibid., p. 133.
[10]Ibid.
[11]Marjorie Greene, *The Knower and the Known*. London: Faber & Faber, 1966, p. 186.



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| NEW ENGLAND | VANCOUVER, BRITISH COLUMBIA |
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| OTTAWA, ONT | WASHINGTON-BALTIMORE |
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## ARTICLES



## COMMUNICATIONS



## BOOK REVIEWS






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

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