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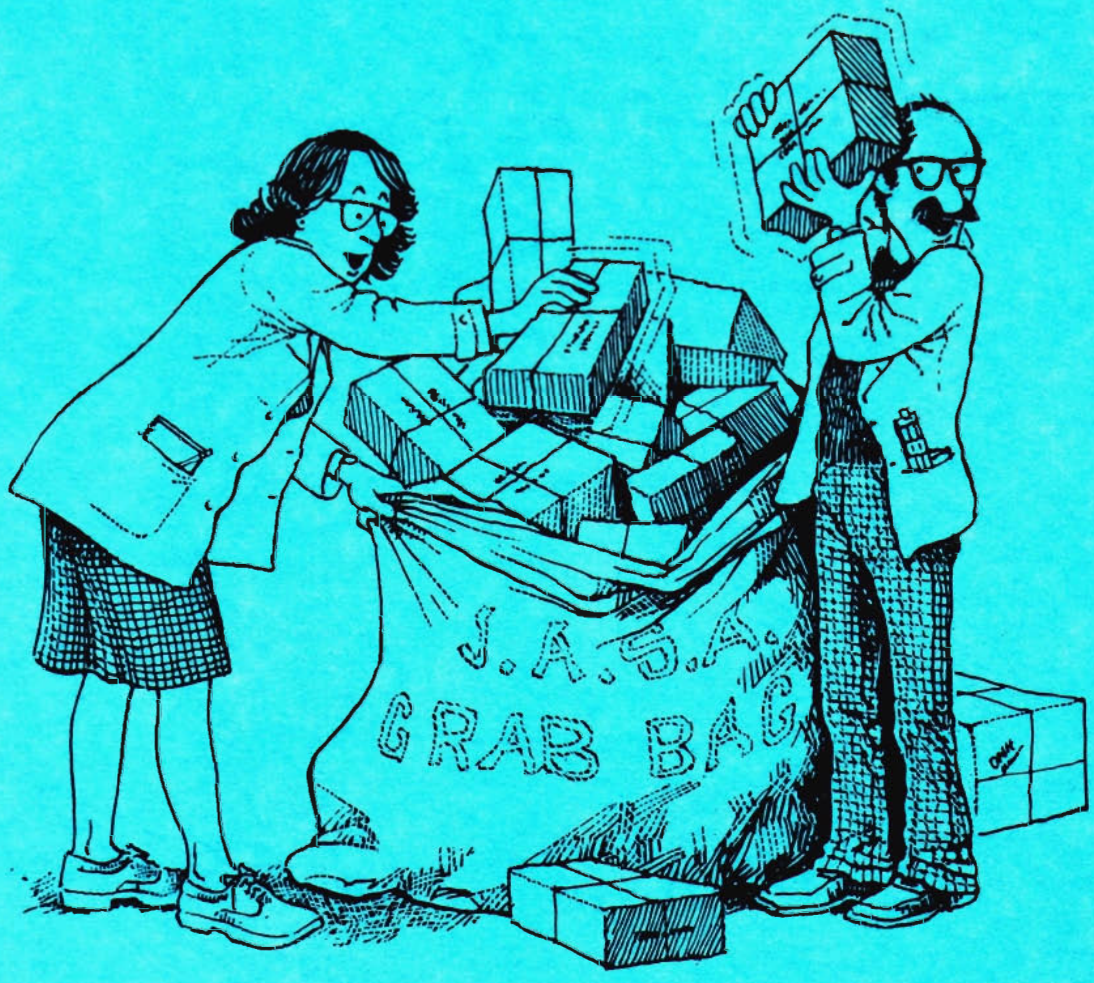

A Collection of Shorter Contributions

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

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A NEW CATEGORY

With this issue of the *Journal ASA* your editor begins his 10th year serving you in this capacity. Between 1965 and 1969, the paid circulation of the *Journal* increased from 1600 to 2100 under the able editorship of Russ Mixter; between 1969 and 1978, the paid circulation has continued to climb to 3300. The March 1969 issue was a 32-page issue; today's *Journal* brings you 48 pages in each issue. This success has been due in no small measure to the faithfulness of the many of you who have submitted quality manuscripts and patiently awaited their publication, and to the constant support of our Executive Secretary and the Executive Council members. I wish to express my appreciation to you all for this challenging and stimulating editing opportunity.

A continuing problem has been the sometimes absurdly lengthy delay between acceptance of a paper and its eventual publication. We have for several years been implementing a program to reduce this delay to no more than 18 months, with a delay of 12 months maximum as our goal for the near future. With this issue we formalize an approach that we have started using in the issues of 1977 to provide another medium for rapid publication. The category of *Communications* will now be distinct from the category of *Letters*. *Communications* will be short treatments of a broad variety of subjects of interest to the readers of the *Journal*, not to exceed 6 pages in length, with a guaranteed publication within no more than 9 months from acceptance. Editorial correspondence with respect to previous issues will be published separately under the *Letters* category.

Your comments and suggestions are always received with enthusiasm and gratitude at the editorial office. Thanks for your help, your prayers and your general support.

R.H.B.

The Impact of Three Mathematical Discoveries on Human Knowledge

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The period from 1826 to 1931 was a century filled with significant developments in every area of mathematics. The year 1826 is noteworthy, marking the discovery of non-Euclidean geometry. This discovery changed the way in which man thought about mathematics and led to a rapid growth of many new kinds of mathematical structures as well as the adoption of the axiomatic method as the format for these developments.

In the middle of this period, Georg Cantor's work with the concept of infinity in his theory of sets and the subsequent paradoxes that were discovered in his work led to the development of different philosophies of mathematics, each with sharply drawn lines of distinction regarding the nature and extent of mathematics.

The close of this period in 1931 refers to the publication of the remarkable paper by Kurt Gödel on the foundations of mathematics. His results ended the dreams of some mathematicians, notably David Hilbert, of the potential of the axiomatic method and initiated a fresh investigation into the nature of mathematics that has continued until today.

If one holds the common misconception that mathematics is little more than a collection of clever devices for working with numbers, then it should come as a surprise that modern mathematics contributes significant insights toward the answers of such basic questions as — What is truth? What is the nature of the infinite? What are the limits to the extent and kind of man's knowledge?

This paper discusses three discoveries that are important not only within the field of mathematics, but which also have broader significance. These results are probably not widely known because, although they are understandable by one who does not possess extensive mathematical facility and training, they are not the material commonly taught in the high schools and colleges. These three results are the discovery of non-Euclidean geometry in the 1820's, the development of infinite set theory by Georg Cantor in the 1870's and the foundational results of Kurt Gödel in the 1930's.

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Non-Euclidean Geometry

Most people are familiar with Euclidean geometry to some extent because they studied it in high school. But few know about non-Euclidean geometries or their significance for present world views. Let us consider now this interesting and far-reaching development.

In the 4th century B.C., the Greek mathematician Euclid compiled many of his results and those of his contemporaries into a remarkable work, the *Elements*. Beginning with 23 definitions and five postulates, Euclid used deductive reasoning to obtain 465 theorems, dealing mainly with geometry, but also including number theory and algebra. We now know he omitted some necessary postulates, but this has no effect on our discussion. The fifth postulate is popularly known today as the parallel postulate. It asserts that through any point P not on a given line L, exactly one line can be drawn that is parallel to L, in the sense that the lines will never meet, no matter how far they are extended.

For some reason still not clear today, this parallel postulate provoked great concern among many who felt it could be proved as a theorem using only the first

four postulates, rather than being independent of them. Although this question in no way affected the content of the *Elements*, it remained an absorbing and unsolved problem to a large number of mathematicians for more than 2000 years. Then around the year 1825, three men (the great German mathematician and astronomer Gauss, the Hungarian army officer Bolyai, the the Russian professor Lobatchevsky) working independently of each other, came to a surprising discovery: it had been so difficult to prove that the parallel postulate depended on the first four postulates because it was not true. Not only was the parallel postulate independent of the first four postulates, it was also independent of the physical world.

At this point, it is pertinent to review the mindset of the early nineteenth century. The main theorems and formulas of the calculus had been discovered near the end of the seventeenth century by men such as Newton and Leibniz. In the eighteenth century, men such as Euler and Laplace applied the calculus with remarkable success to describe and solve an abundance of physical problems such as the motion of heavenly bodies. In all of this, Euclidean geometry was believed to furnish the unique mathematical description of the physical world. It consisted of results that were universally accepted as the absolute truth about our world; e.g. in every triangle, the sum of the angles is 180 degrees. Thus, man was confident of his ability to reach certainties in mathematics. In fact, mathematics was the last area of knowledge in which man thought he could obtain absolute certainty; now this idea was shattered forever. For the essence of the discovery of non-Euclidean geometry is that Euclidean geometry becomes but one of many possible consistent geometries, any of which might be a valid model for the physical world. Instead of one unique parallel line to L through P, there might just as easily be none, two, three, or even an infinite number.

Several decades passed before more than a few scattered individuals realized the implications of non-Euclidean geometries. Then in the early 1900's, Albert Einstein used one of the non-Euclidean geometries as the model for the physical world in his famous theory of relativity. The popular form of this theory quickly captured the attention of the public, giving dramatic evidence that non-Euclidean geometry could apply to a physical situation. Many believe the introduction of the concept of relativity into all areas of human knowledge and activity to be a consequence of non-Euclidean geometry. Morris Kline expresses this very well.

> All people, prior to non-Euclidean geometry, had shared the fundamental belief that man can obtain certainties. The solid basis for this belief had been that man had already obtained some truths—witness, mathematics. No system of thought has ever been so widely and completely accepted as Euclidean geometry . . . Men such as Plato and Descartes were convinced that mathematical truths were innate in human beings. Kant based his entire philosophy on the existence of mathematical truths. But now philosophy is haunted by the specter that the search for truths may be a search for phantoms.
>
> The implication of non-Euclidean geometry, namely, that man may not be able to acquire truths, affects all thought. Past ages have sought absolute standards in law, ethics, government, economics, and other fields. They believed that by reasoning one could determine the perfect state, the perfect economic system, the ideals of human behavior, and the like. The standards sought were not just the most effective ones, but the unique, the correct ones.
>
> Our own century is the first to feel the impact of non-Euclidean geometry because the theory of relativity brought it into prominence. It is very likely that the abandonment of absolutes has seeped into the minds of all intellectuals. We no longer search for the ideal political system or ideal code of ethics but rather for the most workable.[1]

Mathematics possesses a vitality that seems to guarantee a long future of new ideas and significance for all areas of human knowledge.

It is essential to realize that the discovery of non-Euclidean geometries did not prove absolute truth did not exist. The mathematicians were asserting only that absolute truth could not be proved within their discipline. This assertion does not abolish truth, but rather indicates it may transcend the highest level of human thought and effort. Unfortunately, most disciplines reacted by denying the existence of absolute truth, asserting all things to be relative, whether they are in politics, ethics, or even theology. While this reaction may have been in response to a mathematical discovery, it must be emphasized it was not a necessary reaction. How often we see non-scientists alter their beliefs because they misunderstand the meaning of a scientific or mathematical discovery.

On the other hand, mathematicians, rather than despairing at this apparent deficiency in man's ability to know truth, accepted it as an open invitation to expand their searches for new results in all directions. They would now emphasize the ideas of consistency and validity, rather than that of truth. Endless variety thus became another consequence of the discovery of non-Euclidean geometry for the mathematical world. Instead of one geometry (i.e., Euclidean), there were now many. Instead of one number system (i.e., our usual one), many others were discovered in the years after 1845, leading to the modern structures in abstract algebra. Instead of one infinity, we will see how Cantor showed in the 1870's that there were many different infinities. And instead of one logic (i.e., Aristotelian two-valued logic), the years after 1920 saw the development of new logics, each leading to different mathematical systems.

Infinite Set Theory

One problem area had consistently surfaced throughout the history of mathematics, that of the infinite. In the case of Euclidean geometry, it was the parallel postulate that dealt with the infinite. The problems that arose when an attempt was made to decide whether two lines would meet if extended indefinitely has already been discussed. Also, one who has studied the calculus will recall the centrality there of the limit concept, which is the mathematician's way of dealing with the infinite. However, in spite of the frequent occurrence of the concept of the infinite before the 1870's, people had not thought with much clarity

about it. It remained a fuzzy concept, somewhere beyond the reach of man. Infinity was viewed as an absolute and unique entity, a vast pool into which everything non-finite blended.

Then a German mathematician by the name of Georg Cantor, motivated by his researches in an advanced area of the calculus (convergence of Fourier series), began a careful investigation of the theory of sets, and especially the properties of infinite sets, those possessing a non-finite number of members. The results that he discovered revolutionized several areas. His concept of a set has proven fruitful as the basic language to use in describing most areas of modern mathematics. In fact, the twentieth century has been the scene for use of the language of set theory and the axiomatic method to reformulate much of the known mathematical results. What we refer to as the "new mathematics" is really in large part the old mathematics expressed in the new language of set theory.

But it was when Cantor dealt with infinite sets that some truly significant results arose. Upon sending some of these results to a friend, Cantor remarked, "I see it, but I don't believe it." Another mathematician, on reading Cantor's results exclaimed, "This is not mathematics, this is theology." Let us examine the nature of results that would evoke such responses.

The set of counting numbers 1, 2, 3, . . . is almost universally recognized as a familiar infinite set. No matter how large a number is chosen from this set, there is always a larger one. This common view of infinity—when there is no end but always another element—has been called the concept of "potential infinity" by David Hilbert. The infinite is never reached, but it is potentially there in the sense that there is always another element beyond any chosen one.

Cantor extended his work to the realm of the "actual infinite." That is, he considered the counting numbers as a completed set and began to form and to work with subsets of this set. This approach led to several remarkable results, a few of which are discussed here.

Cantor began by defining when two infinite sets were of the same level of infinity, or equivalent, in the sense that their elements could be matched up in a one-to-one manner. Thus, even though the set of all counting numbers $N=[1,2,3,4, \ldots]$ is obviously different from the set of even counting numbers $E=[2,4,6,8 \ldots]$ they are seen to be at the same level of infinity under Cantor's definition by observing the one-to-one matching of n from the set N with $2n$ from the set E. Even though the set R of all rational numbers seems to be infinitely larger than the set of natural numbers N (for between any two natural numbers, there are an infinite number of rational numbers), Cantor showed R to be of the same level of infinity as N. Then he was able to demonstrate two sets (the natural numbers and the real numbers) which could not be matched up according to his definition of equivalence, and thus were of different levels of infinity. In fact, Cantor showed there must be an unending string of larger and larger infinities.

Before Cantor, whether one accepted the position of a potential or actual infinity, whether one was a mathematician or not, whether one was thinking from a Christian perspective or not, whenever one spoke of infinity or the infinite, he thought there was only one infinity: whatever was beyond the finite. For a theologian such as Strong, this was the basis of arguing for one God and for a finite universe.[2] For if there is but one infinite, he argued, it would be contradictory to speak of two different infinite beings, or of both an infinite God and an infinite universe. The two could not subsist together. It would make an interesting question to try to relate the one infinity of the theologian to the endless number of infinities of the mathematician.

The consideration of eternity as endless time is not generally accepted by theologians, who prefer to consider eternity as an entity distinct from time. We can think of eternity, however, only in the framework of time, and thus often carelessly speak of eternity as endless time. We should rather think of eternity as qualitatively different from time, not as quantitatively different. For example, in John 17:3, eternal life is not viewed as an endless life, but as an experience of knowing God. "And this is eternal life that they may know Thee the only true God and Jesus Christ whom Thou hast sent." II Corinthians 4:18 suggests that eternity consists of entities beyond the realm of man's insight—"The things which are not seen are eternal."

The Philosophies of Mathematics

Widespread disbelief of the validity of Cantor's findings developed quickly, so much so that personal attacks were mounted against Cantor, especially by Kronecker, a mathematician at the University of Berlin. These led to mental breakdowns and denial of a university position at the University of Berlin that Cantor desired. A number of men began to find paradoxes within set theory which seemed to augur evil for all of mathematics. The attention of many turned to attempts to vindicate mathematics by resolving the paradoxes and developing philosophies of mathematics that would describe the true nature of mathematics; the paradox of the barber who shaves all those men and only those men in his village who do not shave themselves, is probably the best known.

Though the sharp distinctions have mellowed considerably over the years, the original situation was the development of three distinct philosophies of mathematics, each with vigorous proponents and well-defined battle lines. This inauguration of a serious investigation into the foundations of mathematics and the development of philosophies of mathematics was another significant consequence of Cantor's work with the infinite.

The first of these three philosophies was *intuitionism,* advocated mainly by Kronecker in the last decades of the nineteenth century, followed by Brouwer in the opening years of the twentieth century. Their rallying cry was the famous statement of Kronecker, "God made the integers, all else is the work of man." It was especially the work of the man Cantor in infinite set theory which infuriated Kronecker. He insisted that only those results that could be proved in a finite number of constructive steps were acceptable as mathematics. While this viewpoint had the advantage of making mathematicians more cautious of the reasons given in their proofs, it also severely limited the scope

of mathematics. Many basic results could not be accepted under the strict limitations of the intuitionists.

Another objector to the infinite set theory was Bertrand Russell; he was among the first to discover some of the paradoxes it contained. Since so much of mathematics had been restated in terms of this new universal language of set theory, the paradoxes necessitated a drastic reassessment. Russell's answer was to begin the second philosophical school, *logicism*. His thesis was that mathematics was but a branch of logic, so if one could place logic on a firm axiomatic basis, then the results of mathematics would be safe in this new universal language. The *Principia Mathematica* was written by Bertrand Russell and Alfred Whitehead to demonstrate the validity of this thesis. Although the *Principia* provided the tool of symbolic logic, their commitment to logicism made long, plodding proofs of the most elementary mathematical results. As an example, they must go more than 200 pages into the second volume before proving that $1 + 1 = 2$.

Then, the German mathematician, David Hilbert, began the third philosophical school, *formalism*, in strong reaction to the strict curtailment of his beloved mathematics that was imposed by the intuitionists and logicists. The name "formalism" refers to Hilbert's strong dependence on an axiom system in which the symbols are manipulated according to the formal rules of the system without an attempt to attribute any meaning or interpretation to the symbols themselves. It was his goal to demonstrate both completeness and absolute consistency for an axiom system which had the natural numbers as a model. Since the set of real numbers, as well as the calculus and its applications, are ultimately based on the natural numbers, and since Euclidean geometry had been proven consistent if the natural numbers were consistent, such an achievement would vindicate mathematics in large measure.

Completeness would be established if every question that could be posed in the language of the axiom system could be answered within the system. Absolute consistency would be established if it could be proven as a theorem within the system that there were no contradictions in the system. It should be stated that Hilbert was the outstanding mathematician of his day and so his efforts were widely followed by the mathematical community. Throughout the 1920's, Hilbert and his followers made slow but continual progress in their assigned task. Some areas were proven to be consistent within themselves and complete; one example was the predicate calculus of Russell and Whitehead.

Then in 1931, a 25-year-old mathematician at the University of Vienna, Kurt Gödel, published what is probably the most startling result in the foundations of mathematics, showing that Hilbert's goal was unattainable. Gödel's paper is deeply involved with formal logic, but in simple terms he proved that no axiom system significant enough to contain our usual number system among its possible models could be proved consistent except by going outside the system. Furthermore, even if such a system could be proved consistent, it would necessarily be incomplete in that one could always state propositions that could not be proved true or false within the system. This inability to simultaneously obtain both consistency and completeness in an axiom system reminds one of the indeterminacy principle of Heisenberg with the similar inability to simultaneously know both position and velocity. It was very disappointing to realize that the axiomatic approach which seems to furnish man his best means for knowing, and which had served so admirably in the 1800's for generating and expressing new mathematics was now shown to be unavoidably defective in this way.

The believer, upon reflection, will realize the extensive use of axiomatics in Scripture. For one example, the parables of Christ are axiomatic in nature, with a presentation of the primitive terms and the axioms, leaving it to the hearer to assign an interpretation to the system. In the parable of the prodigal son, we have as the undefined primitives such concepts as the older son, the younger son, the father, the far country and the fatted calf. The axioms would include such statements as, "The younger son went to the far country" and "The father had the fatted calf killed." While no theorems or conclusions are presented in the parable, we find ourselves compelled to conclude that the father loved the younger son dearly. The numerous models or interpretations of this parable that have been presented from the pulpit indicate the attempt of men to derive the theorems implicit in this axiomatic system.

As a second example, we consider the reasoning of Paul in his presentations of the gospel along the route of his missionary journeys. In axiomatic language, we might say that he was trying to demonstrate that Jesus of Nazareth was the only one who satisfied all the "axioms" for the Messiah that were presented in the Old Testament. Those who were open to follow his logical arguments accepted Jesus as Christ. Those who already "knew" what they thought was the truth, furnished the opposition to Paul's ministry.

The widespread usefulness of the axiomatic method both within mathematics and outside it, encouraged man to try to find some way to justify his usage of axiomatics, even though the method had been shown to have inherent weaknesses. And indeed, the initial reaction of Hilbert and most mathematicians to these limitations was one of despair, but the realization gradually came that there was also a positive side to Gödel's results. For they opened whole new areas in the foundations of mathematics, as well as new vistas to our understanding of the power of the human mind.

Summary

Toward the end of the eighteenth century, some mathematicians feared that mathematics was almost a closed subject, with all its questions answered and no new fields to investigate. However, we have seen that the discovery of non-Euclidean geometry opened the gates for the proliferation of new structures and new topics using the axiomatic method. Then the remarkable achievements of Cantor in the field of infinite set theory led to a new language for mathematics as well as furnishing the impetus for an investigation into the nature of mathematics. The resultant

philosophies and the reactions to the results of Gödel have shown us that mathematics possesses a vitality that seems to guarantee a long future of new ideas and significance for all areas of human knowledge.

REFERENCES

[1]M. Kline, *Mathematics for Liberal Arts* (Addison-Wesley, 1967), pp. 475-6.
[2]A. H. Strong, *Systematic Theology*, Vol. 1, (Judson Press, 1907), pp. 254-255.

Models for the Integration of Psychology and Theology

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Contemporary attempts at integration of psychology and theology are described by MacKay as "piecemeal" rather than "basic," because of their emphasis on end products rather than basic processes. This emphasis characterizes the popular acceptance of psychology as it is and theology as it is with no more than a review of their findings to see if they agree, are at least complementary, or if one can be recast in the other's terms. Five examples are presented: the Certainty Model, the Conformability Model, the Convertibility Model, the Compatibility Model, and the Complementarity Model. The argument is developed that basic integration is possible only when humanness and human-divine encounter are incorporated into psychology and theology, allowing integration to become a process of living with God. This is called process integration. For process integration to be possible, changes are needed regarding the conduct of both psychological and theological inquiries, which tend to deny and restrict humanness, respectively. Finally, comparisons are made between product or conceptual integration and process or embodied integration, in terms of motives, emphases, requirements, procedures, results, and basic questions.

"We don't start far enough back. We take science and Christianity as *given systems*. Basic integration means starting from God."[1] This is the distinction Donald MacKay makes between what should be—"basic integration"—and what usually is—"piecemeal integration." It is a useful distinction in describing contemporary attempts at integrating psychology and evangelical theology. Such piecemeal attempts tend to start with end products rather than starting with the basic processes used in obtaining the products. This emphasis on product rather than process, on achievement rather than activity,[2] is an acceptance of psychology as it is and theology as it is (as given systems). What is then called integration is merely a review of psychological and theological findings to see if they agree, are at least complementary, or if one can be recast in the other's terms.

Basic Models

The psychological and theological findings or products that appear most often in the integration literature generally are of four types.[3] (1) psychological *techniques* to apply to problems of living; (2) scriptural *rationales* for psychological findings; (3) *descriptions* of Christian experience and human experience in general; (4) psychological *prescriptions* and scriptural *imperatives* for everyday living. These products are then integrated in various combinations, through the the utilization of the following five models:

1. *Certainty*[4] —using psychological understanding only if it is directly supportive of and subsumed under one's faith system; treating verbalized, propositional truth dogmatically as "exclusive truth."

2. *Conformability* —reanalyzing psychological data and/or restating psychological conclusions in the perspective of a Christian world view;[5] bringing more of psychology, through reinterpretation, "under the authority of Scripture" than the Certainty Model, by taking psychology at face value, can tolerate.

3. *Convertibility* —incorporating a psychological conclusion, such as Freud's safety valve view of sexuality,[6] into biblical interpretation when such additional information promises to flesh out a difficult passage of Scripture; reifying a construct and then "deifying the reification."

4. *Compatibility* —looking for where psychology and the Bible seem to be saying the same thing;[7] lining psychological findings up on one side and theological findings on the other, point for point, and "zipping them up."

5. *Complementarity*—utilizing different levels of description to form a hierarchy: one level presupposes another and reveals its significance in fresh categories;[8] the religious account of reality is "higher" than the scientific.

The Certainty Model seems to be the most popular model among theologians, while the Compatibility Model seems to be most popular among psychologists. All five of the models, however, fall short of what I would regard as basic integration. The Compatibility Model, for instance, builds bridges in the air between two towers of knowledge—what is missing is the building of a foundation on the common ground of psychology and theology. I believe that common ground is the *humanness* of each inquiry.

Humanness

Basic integration must, in MacKay's terms, start from God. This means to me that if we are to know God's truths, we must enter into dialogue with God. To know His truth is to know Him, which is a matter of communication. This is where humanness becomes the basis for integration, for in order to have contact with God, there must be some basic similarities with Him:

> In other words, for man to receive spirit, man must be spirit in himself. If man is to receive sense impressions, he must be sensual; if he is to assimilate food, he must be organic in nature; if he is to receive images and ideas and hold them, he must be intellectual; if he is to be held responsible to certain prescriptive laws, he must be volitional. Likewise, if God is to come as Holy Spirit and dwell with man, man must be spirit to be truly "present" with God . . . . This can only mean, in modern terms, that God is *Person*, and man is *person*, and that they are truly and fully "present" with each other only on the level of interpersonal relationship.[9]

Person to person, Spirit to spirit—that is the common ground for interaction with God and for the basic integration of psychology and theology. It is this person/spirit quality that I am calling humanness. But

We need to accept the balanced, biblical view of the whole person.

it is precisely this quality that is controlled out of the participants in the "well-designed psychological experiment," by the systematic assignment of personal feelings, meanings, and values to contaminating variables, error variance, and residual matrices. Person/spirit qualities are treated as "epiphenomena," "mental way stations," and "explanatory fictions,"[10] so the subject is dehumanized; personal participation is denied, so the experimenter is dehumanized. This amounts to one nonperson studying another nonperson! We are left with what C. S. Lewis called "men without chests."[11] And how does the Person of the Holy Spirit contact a nonperson?

Humanness has been operationally defined out at the level of psychological investigation and also at the level of integration, which seems to be based on two assumptions: (a) science/psychology and theology are man-made; the Bible and Nature are God-made;[12] (b) the knower need only possess intellectual honesty and personal integrity;[13] the known is created and ordered. Integration, then, is possible because psychology and theology both investigate the same created, ordered universe, and the investigator retains his/her scientific and Christian standards with unfailing honesty and integrity. God's place in all of this is simply a passive cause for agreement—He is active only in upholding what is being investigated.

We need an integration model that recognizes (1) the personal participation of the knower in the knowing process,[14] (2) that in the process of knowing we are in-formed by the thing understood while simultaneously we give form to the thing we understand,[15] and (3) God's activity in the process of the investigation, i.e., during the generation of the data. By thereby incorporating humanness and human-divine encounter into our inquiry and integration, God permeates even the doing of psychology, and living with God becomes the vehicle for interpreting His natural and propositional revelations. This is what I would call *process integration*, whereby God is continuously revealing Himself through His creation and is active in the doing of psychology and theology.[16]

The focus of process integration shifts from integrating the products of psychology and theology to the process of living with God. Note that the shift is one of changed focus. It is not a relativistic position (there are no facts). It assumes that "integration" occurs only because God is active in all of His creation, upholding every activity, scientific or otherwise, in the universe. To focus directly on integration itself (e.g., the Certainty, Conformability, Convertibility, Compatibility and Complementarity Models) is to give it an ontic dignity and status it does not deserve.[17]

In order for process integration to be possible, we will need a change of focus not only in the working out of our individual integration systems and in the conduct of our psychological inquiry, but equally important, in the conduct of our theological inquiry. While we need a psychology that does not dehuman-

ize me by reducing me to a machine, denying my personhood,[18] we also very much need a theology that does not despiritualize me by reducing me to a mind, restricting my personhood. It seems to me that as modern psychology has overemphasized behavior as the unit of analysis, evangelical theology has overemphasized thought as the unit of analysis. The propositional thoughts contained in Scripture are seen by many as the necessary and sufficient means to all truth —as exclusive truth, negating any need for further revelation in any form from the Lord our God. It is almost as if the Bible has become for them a modern idol!

The Wholeness of the Person

But God does not traffic only in ideas. That is hard to appreciate, because we have gotten away in our modern scientific age from the wholeness of the person, from the unity of our bodily/mental/soulish functions.[19] All of the product models of integration listed above are models of conceptual integration, aimed solely at the mind. Somehow it is forgotten that phenomenologically much of our involvement in life is at a nonverbal, preconceptual, feeling level. We are involved bodily/preconceptually in our situations even before we have words for them. In short, the body is a communication system, not a mere "container for the soul." Could not God, then, reveal His will to me through feelings as well as through thoughts? As for those who automatically disparage feelings, cannot thoughts lead one just as far astray as feelings? For example, it is easy for us to rationalize away what we know "in our heart" to be true, even while knowing "deep down" that we are being only superficially rational.

We need to accept the balanced, biblical view of the whole person. The division of people into rational (the accuracy of reason) as good, and irrational (the untrustworthiness of feelings) as bad, reflects our rebellion against God and our own created nature.[20] Perhaps it is just such a mind-bias that typifies present-day evangelical theology, that causes us to experience our integrative efforts all in our heads, to become top-heavy, and to fall flat on our faces!

Motives for Integration

Perhaps we also need a change of focus in our motives for integrating. One way of looking at motives is our attempt to demonstrate through integration our belief in regard to God's intervention or nonintervention in modern culture. The following summarizes the various options:[21]

Model	*Motive*
Certainty	Christ *against* culture[22] 1. antagonism 2. either Christ or culture
Conformability	Christ *above* culture 1. artificiality 2. in Christ human aspirations reached their highest culmination, but He also brought in Himself something that neither arose out of culture then nor contributes very directly to it now
Convertibility	Christ *of* culture 1. agreement 2. Christ was simply the highest fulfillment of cultural aspirations
Compatibility; Complementarity	Christ *and* culture 1. accommodation 2. obey society's institutions (present-day psychology?) and hope for ultimate justification
Process	Christ *transforming* culture 1. mediation 2. Christ fulfills, transcends, and actively intervenes in culture

Conclusions

In conclusion, to more vividly highlight their differences (but not necessarily their deficiencies), I offer the following summary of the primary characteristics of product modeling (pm) and process modeling (PM):

Emphasis

(pm) Psychological and theological products of knowing

(PM) Psychology and theology as ways of knowing

Requirement

(pm) Similar products

(PM) Similar processes

Procedure

(pm) Intellectually compare products of knowing—conceptual integration

(PM) Become bodily/mentally in-formed through the process of knowing—embodied integration[23]

Results

(pm) Talk about truth—exposit—put truths on the world

(PM) Live truth—embody—live truth in the world

(pm) Solve problems

(PM) Commit ourselves over time to the appropriate authority(ies) by which we may have an interpretive framework for our experience and guide for responsible choices, in all areas of our existence and at every level of our awareness[24]

(pm) Defend the faith—fight against the world transforming the word (the Bible)

(PM) Affirm the faith—facilitate the Word (Jesus Christ) transforming the world

(pm) Know about God

(PM) Know God

Basic Question

(pm) What is God's truth?

(PM) How does human-divine encounter take place?

REFERENCES

[1]Donald M. MacKay, "Basic Versus Piecemeal Integration," keynote address for the Thirty-First Annual Meeting of the American Scientific Affiliation, Wheaton, Illinois, August, 1976.

[2]Arthur F. Holmes, *The Idea of a Christian College,* Grand Rapids: Eerdmans, 1975.

[3]Numbers 1-3 are taken from Clinton W. McLemore, "The Nature of Psychotherapy: Varieties of Conceptual Integration," paper read at the Twenty-Third Annual Convention of the Christian Association for Psychological Studies, Santa Barbara, California, June, 1976.

[4]The Certainty and Compatibility Models are similar to "indoctrination" and "interaction" (Holmes, *op. cit.*), and "the apologetic response" and "the correlational response" (Samuel R. Schutz, "Christian Authority: A Detriment to Psychological Theory?" *Journal of the American Scientific Affiliation,* 1975, 27, 66-68). Both Holmes and Schutz espouse a third category as a corrective: "integration," which emphasizes activity as opposed to achievement; "the radical response," which emphasizes activity as opposed to propositional certainty.

[5]Ronald L. Koteskey, "Man in Christian Psychology," paper read at the Twenty-First Annual Convention of the Christian Association for Psychological Studies, Stone Mountain, Georgia, April, 1974.

[6]For a discussion of some of the inadequacies of the Freudian view of sexuality, see Kirk E. Farnsworth, "The Myth of the Machine," *His Magazine,* 1974, 34 (5), 28-30.

[7]John D. Carter, and Richard J. Mohline, "The Nature and Scope of Integration: A Proposal," paper read at the conference, Research in Mental Health and Religious Behavior, Atlanta, Georgia, January, 1976.

[8]Donald M. MacKay, *The Clock Work Image: A Christian Perspective on Science,* Downers Grove: InterVarsity, 1974; Richard H. Bube, *The Human Quest: A New Look at Science and the Christian Faith,* Waco: Word, 1971.

[9]Arnold B. Come, *Human Spirit and Holy Spirit,* Philadelphia: Westminster, 1959, p. 73.

[10]This is descriptive terminology employed by B. F. Skinner. See T. W. Wann (Ed.), *Behaviorism and Phenomenology: Contrasting Bases for Modern Psychology,* Chicago: University of Chicago, 1964.

[11]C. S. Lewis, *The Abolition of Man,* New York: Macmillan, 1947.

[12]"God made the world, and God gave the Bible. Men make science and men make theology"—Richard H. Bube, "Towards a Christian View of Science," *Journal of the American Scientific Affiliation,* 1971, 23,3.

[13]Schultz, *op. cit.*

[14]Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy,* New York: Harper & Row, 1964.

[15]Rollo May, *Love and Will,* New York: Norton, 1969.

[16]Kirk E. Farnsworth, "Integration of Faith and Learning Utilizing a Phenomenological/Existential Paradigm for Psychology," paper read at the Twenty-Third Annual Convention of the Christian Association for Psychological Studies, Santa Barbara, California, June, 1976.

[17]This is an application of an idea generated by Al Dueck, "Interpretations of Christ and Culture: The Church, the World and the Profession," paper read at the Twenty-Third Annual Convention of the Christian Association for Psychological Studies, Santa Barbara, California, June, 1976.

[18]See Amedeo Giorgi, *Psychology as a Human Science: A Phenomenologically Based Approach,* New York: Harper & Row, 1970; Ernest Keen, *Psychology and the New Consciousness,* Monterey: Brooks/Cole, 1972; David L. Wolfe, "Could There Be A Humanistic Science of Man?" paper read at the First Annual Psychology Colloquium, Trinity College, Deerfield, Illinois, February, 1972.

[19]Come, *op. cit.*

[20]See Emil Brunner, *God and Man: Four Essays on the Nature of Personality,* London: Student Christian Movement, 1936. In Chapter IV, "Biblical Psychology," Brunner described the schism between "the chill of reason" and "the warmth of feeling," which causes reason to become impersonal and feeling to become the focus of the irrational. To restore both of these important aspects of our created nature, as well as the balance between them, he emphasizes the need for a proper view of feeling, stating boldly, ". . . If I mistake not, feeling is the true crux of all psychology" (p. 169). Similarly, "feeling can be much more sensitive than reason can ever be sensible"—Viktor E. Frankl, *The Unconscious God,* New York: Simon and Schuster, 1975, p. 39.

[21]The list of motives is an application of Niebuhr's categories, in H. R. Niebuhr, *Christ and Culture,* New York: Harper, 1951.

[22]Niebuhr's categories have also been employed by John D. Carter, "Four Models of the Integration Process," paper read at the Second Annual Meeting of the Western Association of Christians for Psychological Studies, Santa Barbara, California, May, 1975. The correlation of Carter's models with those appearing in this paper would appear to be: (1) The Scripture *Against* Psychology—Certainty Model; (2) The Scripture *Of* Psychology—Convertibility Model; (3) The Scripture *Parallels Psychology*—Complementarity Model; (4) The Scripture *Integrates* Psychology—Compatibility Model.

[23]Kirk E. Farnsworth, "Embodied Integration," paper read at the Twenty-First Annual Convention of the Christian Association for Psychological Studies, Stone Mountain, Georgia, April, 1974.

[24]Walter R. Thorson, "The Concept of Truth in the Natural Sciences," *Themelios,* 1968, 5 (2), 27-39.

(Presented at the Thirty-First Annual Meeting of the American Scientific Affiliation, Wheaton College, Wheaton, Illinois, August 20-23, 1976.)

Experiential Learning, Experiential Science and Experiential Religion

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The role of the *experiential* is crucial, particularly in the religious quest. Obviously I need to define what I mean by the term. The dictionary talks of an actual living through an event or events. The emphasis is on closing the psychological distance between that experienced and the experiencer. I am differentiating it from intellectual knowledge and secondhand knowledge. It is a direct knowing with an emotional component and a focus on the subjective.

Experiential Learning

Learning, as every beginning textbook in psychology says, is much more than committing a lot of facts to memory in the context of a schoolroom or the like. Learning is so broad as to include almost every more or less permanent change in a person not due to maturation. If you pay attention to yourself for the next few moments, you can experience the comprehensiveness of the term. For example, you may be biting your fingernails, falling asleep, tapping your foot, sniffing your nose, thinking of the mountains or God or breakfast, creasing your forehead, breathing rapidly, feeling depressed or happy. All of these have learned components.

Psychologists are light-years away from understanding learning. We know that contiguity is important (as with Pavlov's dog), reward and punishment are important, and we know a relatively few facts about how memory and problem-solving work, but the most important things are little understood or researched, e.g., the part emotions play in learning. We don't really understand experiential learning, how it comes about, or what the parameters are.

Allow me to take a minor incident as a prototype. Some time ago we bought a house. The real estate agent had shown us a number of houses on the day we first saw it, driving around an area with winding streets. My sense of direction was fairly good until we got to the house we decided to buy, but somewhere before we arrived I lost track of directions, and I ended up thinking north was in the east and south in the west. Now that seems like a minor matter but do you think I can change it? Not on your life. I have watched the sun, gazed at the north star, looked at maps, toyed with compasses, and looked at basic landmarks from afar and near. With all this, the best I can say is that when I stop momentarily to think about it, north is north, but when I reflexively respond with my sense of direction, north is in the east. Now that is something learned, but how did it become so indelibly impressed, and why is it so resistant to change? Concepts like "readiness" or "critical periods" help focus our thinking about this problem, but basically there is no satisfactory explanation. Clearly learning involves much more than contiguity and reinforcement. It seems we hardly understand learning at all.

But in another way, we have made some significant beginnings. Psychotherapy is learning (I do not mean that it is comprehended by learning theory in its usual meaning). Therapists, especially from the psychodynamic tradition have struggled with the question of how to bring about *significant* learning in their patients. One basic proposition from Freud on, is that an intellectual understanding of abnormal psychology or one's own personal psychodynamics does not come close to insuring health and growth. Insight is a key term, but for insight to be real, it has to be "gut-level," i.e., the emotion or drive or conflict has to be freed enough from repression so that it is deeply felt in awareness together with the cognitive element, the intellectual construction. From this merging (emotion *and* cognition), a genuine "aha experience" can take place. Following Alexander and others, what occurs is a "corrective emotional experience," i.e., experiential learning has happened. Now suppose in our classroom, parental or therapy teaching, we were to say the right thing at the right moment in a pithy, potent and meaningful way so as to tie into the ongoing subjective experience of the person and stimulate growth. This vision excites me.

Education has incorporated similar principles in a few of its processes. Audiovisual aids, for example, help create a deeper experiential (cognition *and* emotion) awareness of the material to be learned. Free schools, (Summerhill and the like) capitalize on the experiential. Still our knowledge of how all this works is primitive, and obviously you can't apply primitive knowledge very satisfactorily.

Personality theorists have long spoken of the importance of some crucial learning experiences in infancy, especially of what the human world is like; an indelible impression is left if the parents are warm, relaxed, acceptant, and loving. Now, consider experiential learning of God. Certainly, the usual pattern of Sunday Schools, confirmations, etc., approach the task mostly intellectually; experiential learning rarely takes place. The fact that many people later toss out or let their religion die is thus not at all surprising.

Values, preferences, attitudes and the like seem particularly to *require* experiential learning. Maslow states it well,

> And it will be just as true for educators when they will finally be forced to try to teach spirituality and transcendence. Education for patriotism in this country has been terribly disappointing to most profoundly patriotic Americans, so much so that just *these* people are apt to be called un-American. Rituals, ceremonies, words, formulae may touch some, but they do not touch many unless their meanings have been deeply understood and experienced. Clearly the aim of education in this realm must be phrased in terms of inner, subjective experiences in each individual. Unless these experiences are known to have occurred, value-education cannot be said to have succeeded in reaching its true goal [1964, p. 35].

Experiential Science

Philosophically and historically, science is simply a way of knowing, of learning, if you will. Objectivity in observation was crucial. Unfortunately, objectivity became like a god; it became an end, not just a means. And with this, the importance of the subjective, the experiencing of the scientist, faded. The scientist excludes himself from his data. If possible, he is so distant from his data that machines do all the observation and recording (they are more objective, reliable and accurate). If this is impossible (or even when it is), the researcher is to become as much like a machine as possible, i.e., mechanistic, objective, nonemotional, nonvaluing, nonhuman. It's not surprising, then, that science itself has often become nonhuman, even antihuman. Scientists are no longer scientists but technicians; science is no longer process and product of the deeply self-actualizing quest for knowing, but just an elaborate, dehumanizing technology which could very well bury us.

But some fresh winds are blowing. Polanyi (1958, 1966), Deese (1972) and others are helping us understand that science is partly art. Discovery is not only a well-defined technique, mechanically taught and wrought, but also an indefinable process going on deep inside the knower. The scientist participates deeply, experientially into his objects of study.

My purpose is not to elaborate on current philosophy of science (Polanyi's scholarly and extensive writings superbly present the case), but to emphasize the significance of the experiential in what has been considered the bastion of intellectuality, mechanism and objectivity.

Experiential Religion

I have already cited the severe shortcomings of the usual approach of institutional religion in helping us develop our awareness and knowing of God. Lessons about God just will not suffice. Similarly, Laski (1961) has noted that typical religious exercises such as prayer, worship services, etc., seldom lead to profound experiential awareness of God.

Religion and peak experiences are as much a learning or knowing as science or other scholarly pursuits.

To me, a very important element in a meaningful experiential religion is that particular kind of experience which Maslow (1964, 1970) calls a peak-experience. What is this? It has been called by other names: mystical experience, a profoundly religious experience, a God experience, ecstasy, etc. There are

> feelings of limitless horizons opening up to the vision, the feeling of being simultaneously more powerful and also more helpless than one ever was before, the feeling of great ecstasy and wonder and awe, the loss of placing in time and space with . . . the conviction that something extremely important and valuable has happened, so that the [person] is to some extent transformed and strengthened even in his daily life by such experiences [Maslow, 1970, p. 164].

In a peak, the whole universe is perceived as an integrated and unified whole. There is the sense of design, that every minute detail "fits," is "right."

> This is not as simple a happening as one might imagine from the bare words themselves. To have a clear perception (rather than a purely abstract and verbal philosophical acceptance) that the universe is all of a piece and that one has his place in it—one is a part of it, one belongs in it—can be so profound and shaking an experience that it can change the person's character and his *Weltanschauung* forever after [Maslow, 1964, p. 59].

In a peak, things tend to become equally important. Comparing this with our usual perceptions will help understanding here. Typically, we attend to the stimulus or configuration while the remainder fades into a background. We tend to feel some things are significant or important, others unimportant. But in a peak, somehow the totality becomes equally important. Every single part, one as much as another, is valued and prized.

In addition, each part has intrinsic worth, not because it might be useful to us or because we were "conditioned" to respond positively to it because of its association with some other valued object. Instead, the person more readily looks upon nature or whatever as there in itself and for itself, and does not project human purposes on it. The perceiving is relatively ego-transcending, unselfish, desireless, detached. It is felt as self-validating, highly valuable. It "proves" life is right, worthwhile, meaningful.

There is a disorientation of time and space in the sense of lack of our usual hyper-awareness of it. It is like experiencing universality and eternity, spacelessness and timelessness. The world is accepted, it is right, even evil seems to have its proper place in the whole of things; pain, disease and death are just there, unavoidable, part of the totality of things, meaningful, acceptable. Facts and values fuse, the secular and the sacred are inseparable. The person feels profoundly

a sense of awe, reverence, wonder, humility, surrender and even worship. There is a sense of being passive, receptive, open. Past (and present) conflicts dissolve, resolve, evaporate. Unity, harmony, integration is the norm. One's own self unfolds. He feels less like an object, less a thing in the world living under the laws of the physical world, more a person, a spiritual being, less driven by needs and wants, more loving and accepting, more a free agent, having free will, more a perfect identity with one's own uniqueness, more non-striving, more selfless, more spontaneous and honest and innocent. The experience easily moves into worship, giving thanks, adoration, giving praise to God (if there are religious overtones) and to an all-embracing love for everybody and everything, leading to an impulse to do something good for the world.

As Maslow notes, "practically everything that happens in the peak-experience . . . could be listed under the headings of religious happenings [1964, p. 59]." Indeed, for me to think of it as an encounter with God has been illuminating, integrative and growth-producing.

What kinds of circumstances lead to a peak experience, i.e., what are the triggers? Here Laski (1961) helps us. She found that people responded most frequently to nature; especially water and heights. Climbing mountains, trees and flowers, flight and songs of birds, the odor of flowers, trees, the earth, the stars, blue sky, clouds, weather including storms, sunrise and sunsets, all of these are some common triggers. Art—if of good quality—is an important stimulus, especially music but also sculpture and other art forms. Architecture is less so except for religious edifices and ruins, but towns or cities viewed as a whole are important. Sometimes private prayer, but more often meditation or contemplation, is significant. Rhythmical movement such as walking, jogging along on a horse, dance, the rhythm of waves lapping at a shoreline, etc., may induce ecstasies. Science, literature, poetry, art, sex, memories, introspection, foods and meals are other triggers.

But negative or desolation experiences are often triggers. Death and illness, ugly people (e.g., "a street-violinist with grey, unbrushed and tangled hair, a hare-lip, and a lame dog"), dirt and squalor, bad weather, loneliness, feelings of falling or drowning or being crushed or overpowered, war, cold and darkness and gloom.

In contrast, certain situations are inhibitors or anti-triggers. "Generally speaking they consist in anything that is inalienably associated with ordinary social life [Laski, p. 176]"—cares, commerce (e.g., advertising), conventionality, worldly enjoyments, crowds, the exercise of reason. Individual differences are paramount; what is a trigger for one person may have no effect on another (or to the same person at a different time) or may be an anti-trigger (especially with desolation triggers). Indeed, it seems possible to identify something as a trigger only retrospectively; to attempt to induce a peak experience is rarely successful. Drugs, of course, have long been used as triggers but with mixed results, often as artificial in result as in cause. Still, an openness, deep and pervasive, a quietness of spirit yet with a hunger or tension or need, the absence of hurrying, and being with oneself will probably, sooner or later, result in a peak experience.

Two final things should be noted. First, Maslow places peak experiences on a continuum, ranging from a very mild mystic experience to the acute, very intense experience where there is loss of self or transcendence of it. Secondly, while peak-experiences tend to characterize self-actualizing people, there are numerous cases of self-actualizing people who are "non-peakers." Maslow notes these people tend to be practical and effective and are probably the social world improvers, the politicians, the workers in society, the reformers,the crusaders, whereas the transcending peakers are more apt to write the poetry, the music, the philosophies, and the religions. Nevertheless, the *tendency* for self-actualizers to have peak-experiences is Maslow's finding.

Maslow wants to view peak-experiences as naturalistic, i.e., without positing a God who is experienced and he emphasizes this at length. Bertocci (1966), however, is critical of this stance.

> Why not let "peak" experiences joust with "religious" experiences without begging deeper epistemological and metaphysical issues? For the fact must still remain for the radically empirical psychologist that millions have had peak experiences which for them (on whatever epistemology) were connected with an encounter with (a certain kind of) Ultimate Being or God, and that this unitive feeling was integral to the very being of the peak experience for them. It may well be that their peak experiences can, as Maslow thinks, be described generically in a more universal language, but their psychological state and behavior at core include the belief that their experience would not be possible if another kind of Being than the one they believed in were encountered. If Maslow is to be faithful to his own concern for non-reductionism, he may need to keep his humanistic-naturalism from tempting him to reduce the phenomena of religious experience into what might well be the lowest-common-denominator of a humanism that still is rather arbitrarily defined. The question: What is the nature of the total environment that stimulates, challenges, or impinges on Man? cannot be answered satisfactorily simply be describing human experience phenomenologically and without raising questions in religious epistemology and philosophical psychology.

Beyond this I would simply like to say that positing a God whom I encounter seems like a much more accurate reflection of my experience than his naturalistic framework.

Here, then, is an experiential content in religion. It is as old as religion itself; it is deeply embedded in the Christian's awareness of a personal God. Man has sought to find and to know God. God can be known. He has revealed Himself in nature and especially in Christ, but also, the Bible records the accounts of man's direct experiences of God. God can be known through these experiences. I would like to share such an experience, simple but profound. Walking down a quiet street a few years ago, I had a peak experience. In the midst of it, I began wondering about God and quickly realized the personal quality of a peak: the world/universe around me was not only right, good, desirable, unified, holistic and all the rest which Maslow describes, but permeating in and through, around and beyond all was Being which I can only describe by saying it was much more like relating to a person rather than an object. Tillich's "Ground-of-all-being" came to mind, and at that moment, the theological concept of omni-

presence became experientially meaningful to me. Even more than that was the sense of personality, omnipresent, but person-characterized, as if I were in communication with the omnipresent person of God.

To summarize, I have emphasized the importance of the experiential in learning and knowing. I regard religion and peak experiences as much a learning or knowing as science or other scholarly pursuits. I am saying that whether one is a child, (watching an insect, exploring a toy or understanding geometry), or a scientist (examining a bit of the universe), or a person reaching out to know God, there must be an experiential living into and through that which is to be known.

REFERENCES

Bertocci, P. Review of A. H. Maslow: "Religions, Values and Peak Experiences," *Contemporary Psychology*, 1966.
Deese, J. *Psychology as Science and Art*, New York: Harcourt Brace Jovanovich, 1972.
Fisher, S. "Experiencing Your Body: You Are What You Feel," *Saturday Review*, July 8, 1972, 27-28.
Laski, M. *Ecstasy*, London: Cresset Press, Ltd., 1961.
Maslow, A. H. *Religions, Values and Peak-experiences*, Columbus: Ohio State University Press, 1964.
Maslow, A. H. *Motivation and Personality*, New York: Harper and Row, 1970.
Polanyi, M. *Personal Knowledge*, New York: Harper and Row, 1958.
Polanyi, M. *The Tacit Dimension*, New York: Doubleday and Co., 1966.

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Society and Abortion

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Introduction

Thirty years ago when I started out in general medical practice (I am now a specialist of skin diseases), therapeutic abortions were permitted if the mother was in danger, with the support of two specialists' consultation reports. Other abortions were outside the law and were done under questionable circumstances in most cases.

Today, here and abroad, society is taking action to implement the U.S. Supreme Court ruling on abortion. Foreign governments are acting to use abortion as a method of population control because there is a shortage of food and housing. Oral contraceptives (the pill), a major alternative to abortion, causes clotting deaths in 3 of each 100,000 people; this is higher than the normal maternal death ratio.

Additional Indications for Abortion

A sober reasoned understanding by society as a whole and by legislators in particular, is being obscured by extremist emotionalism, propaganda groups, and slogans, e.g., from "Right to Life," (no abortions), to "Abortion on Demand," (abortion without restrictions by society).[1]

The following additional indications for the use of abortion may be cited.

1. In both defensive and offensive wars, in criminal justice and death sentences, and in large hospitals where there are not enough respirators or kidney dialysis machines to meet the demand, society must make the difficult choices of who shall live and who shall die. Therefore, abortion also is to be controlled by society.

2. In our public health programs, we must also include concern for the insane and the imbecile, sterilizations, adoption of orphans, prevention and conservation of resources, e.g., food, special housing, hospitals, medicines, etc., as well as concern for tax dollars. In ancient times, the Romans and Greeks would either slaughter the unwanted women, children, slaves, and aged, or leave them to die from exposure to the elements and animals.

3. For many people, suffering is a shattering and undermining experience; for them pain and suffering do not strengthen but rather weaken the moral fiber. We are not "super-man." This is contrary to the views of some of today's Christian clergymen.[2] Most of us do not need to be broken, tempted, and tortured in order to discover the goodness and love of God.

4. The defective child has become a heavy burden, both mentally and physically today, for both the family and society. Thoughtless neighbors by word and deed, imply that there is insanity in any family with a defective child, resulting in psychological damage to the

other children in the home as well as the families involved. In addition to the heavy financial drain on the family's resources, the acquittal of the Belgian mother who killed her thalidomide deformed son, may encourage others in similar circumstances to follow her example. These and other situations have resulted in the recommendation of abortion if there is a psychological fear on the part of the mother.

5. Former Attorney-General Edward Levi (now Professor of Constitutional Law, University of Chicago Law School) states that

> Law has some unique and special functions: it is not primarily a social science describing how some institutions operate; it is not primarily a tool for determining how transactions will turn out, or for predicting what courts will do; these are important services, but they are subsidiary to law's major commitment: to develop concepts, to maintain and operate procedures which enable a sovereign community to be governed by rule for the common good, the attainment of human values, and to make that rule effective.

Today, the legal profession also wishes to know the human rights, including the right of inheritance, of the fetus killed in an automobile accident.

6. The medical profession has made important advances and we present these to society for their assistance and to the legislators for guidance in framing laws to cover the following medical situations.

– We have a group of diseases, e.g., specific heart diseases, the rare *Lupus Erythematosus*, where the additional burden of a pregnancy will kill the mother unless it is terminated. This is under review at the present time.

– We know that if a woman acquires German Measles during the second trimester of pregnancy, i.e., 4-6 months, the fetus will be born dead, or have Congenital Rubella Syndrome, and this includes mental retardation.

– If a pregnant woman acquires one of the so-called "cyto-megalic virus diseases," the fetus is usually born with cataracts, a small head, an enlarged spleen, and mental retardation.

– We are aware and warn pregnant women, that death of the fetus can occur if she acquires Influenza, Measles, Mumps, or Chicken pox.

– With the recently developed amniocentesis procedure (withdrawing about 1 teaspoon of amniotic fluid found in the protective sac around the fetus for analysis), we are better able to identify defects due to heredity, such as:[5] (1) A pregnant woman over 35-40 years of age with a previous child with a chromosomal disease is likely to have a child with Down's syndrome (this was formerly known by the cruel name of mongolism); (2) we are better able to evaluate parents who are carriers of inborn defects; (3) we are able to study and search for errors of metabolism if they are on a genetic basis; and (4) we are able in our family studies to find the so-called "chromosomal translocations."

– The most common single genetic defects found today in the U.S.A. are (1) cystic fibrosis in the general Caucasian population, (2) sickle cell anemia in the black Americans, (3) Tay-Sachs syndrome in the Ashkenazi jews (European), (4) and thalassemia in the Mediterranean and oriental peoples.

– Today we are able to detect the carriers of 50 inborn errors of metabolism, and relay this information to the patients and their families.

– With the recently developed "Chromosomal Beading Technique,"[5] we are able to locate cases with structural rearrangement, to make a pre-natal diagnosis of male and female, and can now save many normal fetuses that were formerly sacrificed. Statistical risks that a fetus would be born with a particular disease, e.g., 1 in 4, or 1 in 500, are dispensed with. For example, if 1 in 400 black Americans would be born with sickle cell anemia, there would be a sacrifice of 399 normal fetuses, in addition to the affected one. Today, with amniocentesis and chromosomal beading, we are able to identify the affected fetus and allow the other 399 uninvolved fetuses to mature to full term.

Governments and Abortion Laws

A survey of history shows that laws of various types of governments relative to abortion were only partially effective guides and deterrents.

– In ancient times, both the Greek and Roman societies widely practiced abortion.

– In Greek society, if a disfigured woman (with child) was not pleasing to the eye of the man, abortion was allowed.

– In Roman society, the father had absolute power over the family. The fetus was a part of the mother and it was not wrong to kill the fetus.

– In the 11th century, the Longobard Edict demanded a fine only if the abortion was done without the consent of the mother or guardian.

– In the Bishopric of Bamberg (1507 AD), it was criminal abortion and murder only if the fetus was animate or viable.

– By 1800 AD, most German states dated animation of the fetus at 4.5 months.[3]

"When Does the Soul Enter the Body?"

This question has been under speculation for at least 3400 years, beginning with Akhnaton (1400 BC), for there are philosophical, religious and legal connotations.[3] The following are only a few of the different points of view.

– To the Romans, animation was at 40 days, whereas the Stoics (around 300 BC) held that the soul entered the fetus just before birth.

– Plato (6th century BC) held that it was at birth, while the Hellenists (after 323 BC) stated that human status was acquired only after taking human food.

– The Christian community has a long and varied history. Instead of taking either the Stoic or Platonic view, they adopted Pythagorus' (6th cent. BC) view that the soul enters the body at the time of conception. This was also held by the others of the Hellenistic school of Greek thought, e.g. Peripatetis, Neoplatonists, Neo-pythagoreans, etc. Tertullian (2nd century AD Early Church Father) adopted the Pythagorean opinion, and this was approved by the church councils at Elvira (305 AD) and Angora (314 AD). These views were accepted by St. Jerome (5th century AD) and St. Augustine (5th century AD) held that to kill a formed fetus 40 days or older is homicide. The Justinian Code (6th century AD) exempted the first 40 days of life from the penalty of abortion, and this held true, except for a brief period (1589-1591 AD), until 1869 AD. The turning point was the Bull of Pope Sextus V (1588 AD) who held that the soul entered the fetus

at conception. In 1869, Pope Pius IX dropped the 40 day rule, and this was re-confirmed in the current Canon Law Code of 1918. This is still in force today.[2]

— A review of Judaism shows that our Jewish friends are opposed to abortion, based on Deut. 30:15, "choose life," as their guiding principle, but based on Gen. 1:29, "be fruitful and multiply," state that each has the duty to have at least one son and one daughter. If they are barren for 10 years, they are eligible to apply for a divorce in the Jewish courts and to remarry in order to fulfill this duty. They applied the principle of compassion (i.e., responsiveness to the suffering of other human beings), to share suffering and so lessen and alleviate it, based on Jer. 8:21, "to be hurt . . . for the hurt of My people": (1) marriage licenses are denied lepers, and since the time of Rashi (1040 AD), "any hereditary disease" was included; (2) rape is illegally sown seed, and is to be terminated; (3) in the presence of physical suffering or disease, abortion is permissible; (4) shame is the greatest of all pains, and the pain of the mother, actual or imagined, takes precedence over the fetus, permitting abortion.

Finally, our Jewish friends have developed a classification of four distinct legal phases for the fetus for their guidance:[3] (1) stage 1 is from conception to the first stage of labor. The fetus has potential life just as the ovum has potential for fertilization, and is an organic part of the mother. If the life of the mother is threatened, one may remove the fetus. (2) Stage 2 is from the onset of labor through its various stages and up to the point that the head is emerging. The fetus has some human rights, but the mother still has priority over the fetus. (3) Stage 3 starts when the child is born and now has human status in most aspects. The mother is still saved at the expense of the child, and the child is a "stillborn" if the child does not live at least 30 days. (4) Stage 4 begins after 30 days of life, when the child has actual life, all the human rights, and status equal to the mother and father.[4]

The Recent U.S. Supreme Court Rulings

In the recent compromise decisions of the U.S. Supreme Court on abortions, they said in effect that (1) in the first trimester (1-3 months of fetal life) of the pregnancy, the pregnant woman and her physician have the total discretion over doing abortions; (2) in the third trimester (7-9 months of fetal life) when the fetus is viable, the state is authorized to prescribe abortions only on an emergency basis; (3) during the middle trimester (4-6 months of pregnancy), neither the state, the patient, nor the physician have total authority. Regulations for the safety of the pregnant woman can be established and enforced.[7]

Application of the U.S. Supreme Court Ruling

Society, the legal and the medical professions cannot find fault with these decisions for the guidance of the community, although they may conflict with some religious beliefs. This compromise is apparently the best possible for all concerned at this time. This ruling does put limits on the individual and is a positive force in the training and guidance of both society and the individual.

We should be grateful and thankful for the additional guidance and direction provided for us in this complex problem by the U.S. Supreme Court.

As servants of society, the scientist, philosopher, priest, lawyer, physician and educator are to increase the general welfare for the betterment of society, through justice and the law, not by *fiat* from some self appointed prophet, but rather through education, truth, law, justice, righteousness, holiness, peace and order. We are a community of laws and not men; therefore we are to work for and through society at the slow but steady progress of mankind using the democratic principle, and not by one man rule, whether it is a Führer, an Il Duce, or a commissar.

Our teachings are to be explained to society as a whole, and when a majority of the people are convinced that there is no harm and only good in our advice, our respective legislators will pass the appropriate laws, for one and all. This is the democratic and biblical way, based on Numbers 15:16, "One law and one ordinance shall be for you and the stranger (the permanent non-Jewish resident or immigrant) that sojourns with you."

It is in this setting that individual states have passed or rejected laws governing abortion for their respective communities. Today, we should be grateful and thankful for the additional guidance and direction provided for us in this complex religious, ethical, moral, philosophical, legal, and medical problem by the U.S. Supreme court.

REFERENCES

[1]"Public Health Groups Urge Liberal Abortion in Israel," *Medical Tribune*, Vol. 16, No. 5, Feb. 5, 1975, p. 29.

[2]B. Ramm, "The Ethical Evaluation of Bio-genetic Engineering," *Journal ASA*. Vol. 26, No. 4, Dec. 1974, pp. 137-143.

[3]D. M. Feldman, *Marital Relations, Birth Control, and Abortion in Jewish Law*, Schocken Publishers, New York City, Paperback ed. 1974, 1968, New York University Press, New York City.

[4]R. Dr. Immanuel Jakobovits, *Jewish Medical Ethics*, Philosophical Library, New York City, 1959, pp. 153-191.

[5]J. H. Nora and F. C. Fraser, *Medical Genetics, Principles and Practice*, Lea and Febiger, 1974, Philadelphia.

[6]W. Pauk, *Handbook of Christian Theology*, Meridan Books, New York City, 1958, pp. 299-310.

[7]D. H. Mills, M.D., "Abortion," *Journ. Am. Medical Assoc.* Vol. 229, No. 3, July 15, 1974, p. 338.

Human Engineering and Christian Ethical Values

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The bio-medical revolution has produced techniques with great potential for affecting the nature and behavior of man. Accompanying this power, however, are grave ethical problems. Our knowledge of techniques of human control has not been accompanied by equal wisdom in the employment of these techniques. The Christian, however, has a high stake in the application of such methodologies.

There are three basic methods of arriving at ethical conclusions: the legalistic, the situational, and the principial. Of these three, only the principial seems to hold promise of being of help to us in solving these problems. Accordingly, we must ask what principles the Christian faith supplies us. Among the pertinent ones are man's role as a dominion-haver, the importance of freedom, truth, and the significance of individuals.

In July, 1975, a group of scientists, theologians, and ethicists gathered at Wheaton, Illinois, in an International Conference on Human Engineering and the Future of Man. Here evangelical Christians grappled with ethical problems growing out of three areas of human engineering: genetic control, brain control, and behavior manipulation.

The necessity of such a gathering is a tribute to man's success, not his failure. The progress of man in natural sciences and behavioral sciences has given him an increased ability to understand, affect, and control human behavior and even human nature. For this we should be properly appreciative. Man's ethical understanding has not progressed at an equal pace, however. How to handle the problems produced by our improved technologies—this is the real issue.

It is encouraging that evangelical Christians gathered to discuss these issues at *this stage* of the development of the problems. Too often the Christian church has had little to say about great ethical issues during the formative period, perhaps because Christians were unaware of the real issues at that time. Then when someone began to apply the insights and methods in ways offensive to Christian morality, Christians protested. The issues are still at the stage where public policy is being determined, and can be affected by our input.

Nature of the Problem

Let us utilize for a moment the technique sometimes employed in movies and books, referred to as 'flashback." Consider the following alternating scenes which move between biblical incidents and contemporary ethical problems. It might go something like this:

Scene 1. Gideon believes that Jehovah God is leading him into battle with the Midianites. He wants to ascertain that God is really going to deliver Israel by his hand. To determine this definitely, he places a fleece on the ground and asks God to show him if He will do this, by making the fleece wet and the surrounding ground dry, and then reversing the process, making the fleece dry and the ground wet. This God does, and Gideon goes out to defeat the Midianites.

Scene 2. A young couple sit with their family doctor, as he interprets for them the results of their genetic screening test. Carefully he explains to them that should they decide to have children, there is a 25% possibility that any child born to them will have cystic fibrosis. What should they do, they wonder. Ought they to proceed, or not?

Scene 3. A man is brought before a judge of Israel, charged with having killed another man. Calmly and carefully the judge determines the facts of the case. Witnesses testify that this one did indeed take the life of the other. There is no evidence that this was an act of

self-defense, or an accident. Quickly the verdict is reached and announced: the law says this man must die.

Scene 4. A lecturer is sharing with an audience the possibilities of electronic stimulation of the brain. He pictures for them a situation in which a group of demonstrators advances upon City Hall to present their grievances to the mayor. Only a group of unarmed police stand between them and their goal. The police chief presses a button on a small radio transmitter in his hand. The protestors stop. He pushes another button and, like the bull in Jose Delgado's experiment, the group turns and obediently trots away.[1] They were responding to an electrical signal sent to a control center of their brains via electrodes surgically implanted during an earlier imprisonment. Now, the lecturer asks, is this type of control right and legitimate, or is it improper?

Scene 5. Jesus and the Pharisees are engaged in heated debate about the observance of the Sabbath. The charge raised by the Pharisees is that Jesus and his disciples have broken the Sabbath. They have performed miracles of healing on the Sabbath day. They have also on another occasion been guilty of gathering food on the Sabbath. These activities constitute labor, and violate the law, which says that the Sabbath is a day of rest, and no labor is to be done on it. "No," says Jesus, "you have misunderstood. The Sabbath is made for man, not man for the Sabbath."

Scene 6. Two parents of an elementary school child are discussing with the school principal the educational philosophy and methodology employed in the school. Because incentives are employed to encourage certain types of activity, the parents believe the children are being manipulated.

It is confusing, is it not? Were we able to have an actual sound-and-sight presentation, it would be even more bewildering. The sudden shifts between the biblical world and that of virtual science fiction seem strange indeed, because of the radical differences between those two worlds, both of which may seem rather foreign to most of us. They highlight however the problem faced by those who would be responsible biblical Christians, trying to live with one foot in the Bible and the other in this strange world of developing issues. How does the Christian relate the teachings of the Word of God to these problems? The selection of a style of ethical decision-making must precede the actual determination of solutions to any of those problems. Several different approaches to applying the Bible to ethical problems have been suggested, and are currently being practiced by various Christians.

Types of Ethical Methodologies

One of these is sometimes referred to as the legalistic approach. It attempts to derive specific absolute statements from Scripture, in the fashion in which a prohibition of murder is deduced from Exodus 20:13, "You shall not kill" (murder). On this method of treatment, unexceptionable rules can be established on a one-to-one basis, from Scripture.

The problem with this approach for our purposes is that it is exceedingly difficult to find biblical statements which can be employed in this fashion. The situations which we are considering here did not arise in Biblical times, nor were they even imagined then. Their problems were not sufficiently similar to these cases that we could simply treat the latter as instances of the former. This method scarcely can succeed.

Once the enduring ethical principles of Scripture have been found and extracted, these must be carried over from biblical settings and related to contemporary situations.

The second major option is situationism. This would ask, with respect to any issue, "what is the most loving thing to do?"[2] On these grounds, nothing is really right or wrong in itself. Anything, even murder or adultery, is potentially good and right and is made so by whether it most fully embodies and expresses *agape* love. The problem with this approach, however, is that it is insufficiently concrete to be of real help. What really is the most loving course of action? Without knowing what is best for man, without being able to distinguish clearly the different courses of action and knowing their consequences, it is very difficult to choose among them. The problems connected with situationism and its calculating method have been elaborated at considerable length in several places. The dilemma seems to be that situationism either slips into a new kind of legalism on the one hand, or else is unable to make any objective ethical judgments, on the other.[3]

The third method of ethical decision-making is principialism. This maintains that there are objective sources of ethical guidance in the biblical revelation, but that these are found (for our present purposes) not in concrete rules, but in principles which are more numerous than simply the general principle, "act in the most loving way."[4] This would seem to be the only approach available to us that can give us any real guidance.

In this principial method, the concrete forms of biblical ethical injunctions are not absolutized as they appear in the Scriptures. Rather, an attempt is made to determine the underlying principle upon which a command or prohibition is based. This will be more general than a rule or law. In some cases the principle will be so closely tied to the particular rule in which it is embodied in Scripture as to be virtually identical with it, but often this is not the case. The principle will be of a timeless character while specific biblical rules may be culture-bound.

Once the enduring ethical principles of Scripture have been found and extracted, these must be carried over from biblical settings and related to contemporary situations. Often this will mean that two or more ethical principles will bear upon a given situation, and the relative weight of these will have to be determined, and the principles combined into new currently appropriate guidelines or directives. This will not be easily done, but it is extremely important.

The aim of the remainder of this paper is consequently to trace out some of the salient biblical and theological principles that bear upon the decisions encountered in the areas which have been presented to us. At some points we suggest implications of these principles for the ethical decisions, but for the most part we offer

these only as aids and suggestions to be incorporated into our decision-making.

Pertinent Ethical Principles

As the psalmist contemplates what man is and does he shows both pleasure and amazement (Psa. 139:14). And well he might, for man is truly the summit of God's earthly creation. He, of all the creatures, is described as being in the image and likeness of God. In the creative genius of man both man and God are glorified, for it is God who is the source of all man's positive powers, and who has entrusted to him the abilities which we see displayed in the activities of knowledge gathering and control. The knowledge explosion of the past few decades is virtually overwhelming in its depth and magnitude. With knowledge goes power, the power to predict and control, especially as the potential for applying it to man increases. In the techniques of human engineering there is great possibility either for good or for evil. Man may employ this to magnify and heighten his likeness to God, or to negate this Godlikeness.

Care and caution are required in these endeavors, because man is limited in his understanding. He possesses the ability to discover truth which he does not have the wisdom to apply. Although the technology is morally neutral, man's finiteness means that he might unintentionally do harm with it. The inventors of thalidomide undoubtedly intended that their discovery should bring only good results, but were unable to anticipate some of its side effects. Further, the Bible teaches that man is a sinner, both by birth and by choice. Consequently, there is considerable likelihood that he will pervert good into evil by misapplying it.

When God created man and placed him in the Garden of Eden, He commanded him to have dominion over every living thing (Gen. 1:26-28). This Christian doctrine of dominion-having has sometimes been blamed for the ecological crisis which threatens to overwhelm our world.[5] Supposedly, the command to have dominion has instead been understood to mean to dominate, so that man has exploited and plundered the creation. This, however, is a misunderstanding of the nature of the command. In its background is the concept of the sovereign or monarch in ancient Israel.[6] The ruler there was not to dominate the people for his own self-aggrandizement. Rather, his position was a trust given him in which he would use his authority in such a way as to develop the kingdom for the maximum benefit of his subjects. He ruled for their sake, not for his own. Thus man as dominion-haver is not to extract all that he can from nature for his own satisfaction. Instead, he should seek to understand it in order to develop it to its maximum potential, that it may fulfill God's intended plan for it. Thus, if we conceive the command to have dominion as including the study, understanding, and control of those aspects of man which he shares with the rest of creation, it is essential that this be done for the benefit and development of man, never for his exploitation.

Three other biblical concepts that bear upon the question of human engineering are freedom, truth and the importance of individuals. These are part of the nature of God Himself, and part of what He expects of man.

The freedom of man is assumed everywhere in Scripture. This is particularly evident in God's dealings with him. Each person is given the opportunity of choosing to accept or reject God's offer of grace. Never is he coerced. When Jesus related to persons, He respected their freedom. In the case of John the Baptist (Luke 7:18-23), He did not threaten or cajole. He did not simply assert His authority and demand response. He presented John with the evidences and let him make his own decision. Rather than creating a set of robots or manipulating men, God took the risk of giving them genuine freedom, knowing that some would abuse it.

This means that in human engineering, care will be taken to preserve that same human freedom. Freedom, unfortunately, is one of those slippery words which frequently are simply used undefined. It would seem to mean at least that the person should be as aware as possible of the factors which are influencing his decisions and behavior. Hence, any type of control through electrical stimulation, like that envisioned by Delgado[7] (improbable though it may be) would seem to be improper. Here the person would be driven by factors which he does not understand and with which he cannot cope. Similarly, none of these techniques should be employed upon a person unless he has freely given his consent, or if he is permanently incapable of doing so, someone else responsible for him has given such consent. In some areas such as genetic control, it is difficult to judge whether an encroachment upon the freedom of the person is involved, or whether it is rather a case of actually constituting him what he is to be. Here it would seem that the parents at least should make the decision.

In this connection we should also note again the dominion-having referred to earlier. This role was assigned to Adam, the head of the human race, who at this point was actually the entire race. The word Adam is not only a proper name. It is also a Hebrew noun, meaning man. Thus the command was given not just to an individual or to part of the human race, but to all mankind. All persons have this privilege and authority. It is therefore wrong for one person or group to exercise dominion over another individual or group, in such a way as to deprive them of their dominion-having. On these grounds, slavery is clearly wrong. The same is true of any form of control in which one's human initiative is surrendered to another. We must be certain that any techniques adopted and employed do not violate the basic rights of persons.

Another significant issue is truth. Basic to the very nature of God is this matter of veracity. He always represents things as they really are. Similarly, He expects that man will seek to know things as they truly are and will represent them that way. God is the author of reality, and truth basically is genuine contact with that reality, or knowing it as it is. The devil is the ultimate source of error or of deception, which is a misapprehension of reality. Experiencing reality correctly is therefore good, for it in effect puts one into relationship with God's works. Thus processes and procedures which conduce to a more correct experience of reality would be good while those which lead him to experiences which are not faithful to the way things

really are must be regarded as bad.

All human emotions have their proper place. It is appropriate to feel any of them in certain situations. Anger, fear, depression, elation, excitement should be felt in certain circumstances, but not in others. Any type of technology or control which helps the person experience an emotion appropriate to the situation is right and ought to be practiced, while any control which produces emotions for which there is no objective basis ought to be avoided. Hence, a frontal lobotomy which eliminates irrational fears would (on this criterion) be permissable, while a person simply pushing a button endlessly to produce feelings of euphoria when there is no real basis for such feeling, or even in the face of stimuli which ought to produce the contrary reaction, would be illegitimate.

Part of the reason is this. Emotions, like physical pain, can be used by God to alert us to situations we might otherwise overlook. For example, depression, fear, or anger call our attention to a situation needing to be dealt with. If the person has been so affected that he does not feel these emotions in the presence of the objective circumstances which ought to call them forth, he may fail to cope with them, and harm may come either to him or to someone else. In this sense, our control or engineering ought to be aimed at contributing to and enhancing fully informed response to reality, rather than detracting from it.

We also note the importance of each individual person to God. Jesus indicated this in numerous ways: In His statement that no sparrow can fall to the ground without the knowledge of the father, and that we are of more value than many sparrows (Matt. 10:28-31); in His declaration that God knows even the number of the hairs of our heads (Matt. 10:30); in the parable of the lost sheep, in which 99 were safely inside the fold, but the shepherd left them to go and seek the one lost sheep (Luke 15:30). All of these indicate that each individual is an end in himself, valuable to God. Each ought to be treated that way, not as a means to the end of another's welfare. Thus, it would be wrong to experiment upon a person, even if many other persons might benefit from it, unless that person fully understands what is being done and why, and has given his informed consent. This means that extra precautions must be taken with populations which are under a certain amount of constraint, such as the military and prison inmates. The CIA's experimentation with LSD upon certain of its employees is particularly reprehensible on these grounds.

Having noted these several cautions and limitations upon our attempts at human engineering, we must see the nature of the positive responsibilities which we have in this connection. Among the values taught and practiced by Jesus were such qualities as compassion and mercy. Frequently, Jesus Himself healed those who came to Him with diseases. He still works miraculously on some occasions. He has, however, also given us medical science and a host of allied disciplines as means to the continuation of His ministry of mercy. Therefore as His agents we should employ every legitimate means to alleviate suffering, or preferably, to prevent it.

There is a particular responsibility to refine and develop these techniques and to make persons aware of their availability. For example, genetic control properly applied has great potential for preventing some of the serious genetically linked diseases such as sickle cell anemia, cystic fibrosis, and PKU. The Christian has a stake in encouraging research in genetic screening, in order to develop tests for additional diseases, and more accurate tests for those which can be tested for. Those who are in a position to influence prospective parents, such as pastors doing premarital counselling, should inform them of the possible dangers of genetic defects, particularly where indicated by family history, and the availability of screening. The principle of freedom mentioned earlier however, indicates that the decision to avail themselves of this information and the action to be taken upon it should be made by the persons themselves.

A problem arises in connection with cases where the actions of persons will affect the welfare of others. In the example above, the parents are making a decision which may bring into existence a child who will experience a great deal of suffering, or who will be a severe economic burden upon society. At what point society should intervene for the benefit of others is a question which cannot easily be determined.

In brief, it would seem that the use of these techniques to remove defective or diseased conditions is permissable or even desirable, while attempts to produce some superior qualities or even a superior breed of human beings would be considerably less justifiable. Problematic is the question of just what is "normal," and what is not. Without an answer to this question, the line between the therapeutic and the superadditive is exceedingly difficult to draw.

The possible spiritual value of human engineering ought not to be overlooked, either. Frequently, the Christian's need to grow in the qualities that constitute Christian character requires more than merely instruction in Christian matters. The connection between truth understood and believed, and the actual behavior of the person frequently is imperfect. This means that irrational factors modify the response of that person. Maturity would mean the reduction or elimination of these factors. It would therefore seem proper to use psychological and other means to help bring about a functioning connection between beliefs and actions. These should not be regarded as a substitute for or competition with the grace of God. Rather, they should be considered means through which He can and does work.

Excessive optimism about the spiritual accomplishments of human engineering should be avoided, however. Some, such as Delgado, have expected to be able to accomplish considerable changes in the human race.[8] There will never be spiritual salvation by genetic, brain, or behavior control. The problem of sin runs deep in man: it will be rectified only by that direct, supernatural act of God which Jesus referred to as the "new birth."

REFERENCES

[1]Jose M. R. Delgado, *Physical Control of the Mind Toward a Psychocivilized Society* (New York: Harper and Row, Publishers, 1969).

[2]Joseph Fletcher, *Situation Ethics* (Philadelphia: Westminster Press, 1966).

[3]Paul Ramsey, *Deeds and Rules in Christian Ethics* (New York: Scribner, 1967, pp. 159-176.

[4]Millard J. Erickson, *Relativism in Contemporary Christian Ethics* (Grand Rapids: Baker Book House, 1974), pp. 129-153.

[5]Lynn White, Jr., "The Historical Roots of our Ecological Crisis," *The Environmental Handbook*, ed. Garrett de Bell (New York: Ballentine Books, 1970), p. 26.

[6]Francis Brown, S. R. Driver, and Charles Briggs, *A Hebrew and English Lexicon of the Old Testament* (Oxford: The Clarendon Press, 1955), p. 921-2.

[7]Delgado, *Op. Cit.*, 1969, pp. 184 ff.

[8]*Ibid*, part V.

Making Sense of Me

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The view of myself presented me by my own discipline of biochemistry is clearly a mechanistic one. Biochemists see *man* (used here in its broadest sense to include male and female, individual and species) as a biochemical machine. We know a lot about how the machine operates and are learning more all the time.

In spite of its usefulness for scientific investigation, the machine model of man is not received with joy by most people. Its detractors include thoughtful nonscientists not otherwise antagonistic toward a scientific outlook, and some scientists, especially those whose work has not led them to investigate human beings. Such persons express concern that use of the machine model has a dehumanizing effect on all who touch it, and worry about the distorted picture of humanity gained from its use.

This paper has grown out of my response, as a biochemist and as a Christian, to such criticisms. Some of my professional colleagues silence critics by ceaselessly pointing to medical applications of biochemistry, since few people are willing to say they would gladly do without life-saving medical knowledge. Badgered by the argument that so much modern medical practice is based on our understanding of biochemical mechanisms, they may grudgingly tolerate the mechanistic view underlying it.

That tactic has little appeal for me. Even if medicine were God's footstool, I doubt that we should swear by it. The danger of dehumanization that *may* arise from looking at man as machinery is undeniable. I have seen it even in hospitals, among practitioners busily engaged in saving lives.

This paper is not a defense but an inquiry. What is the alternative to a mechanistic view? If we are not to see ourselves as biochemical machines, what other view should we adopt? And what can be done with it? Perhaps we can't do biochemistry. I am one biochemist free to accept that possibility, since I no longer have an economic stake in the field. Having resigned from biochemical employment, I've found I can get along without a lot of biochemistry, and that I can't afford much modern medicine.

Refining Some Past Ideas

What I can afford in my umbilically detached state is philosophy. Let me correct that before professional philosophers throw up their hands at yet another unwanted refugee from science whose vain babblings threaten to give their field a bad name. What I have time for now is what Charles S. Peirce called "the Pure Play of Musement."[1] My recent musement leads me to refine some ideas I have written about in the past. For example, in an article entitled "Contra-Cyclops; or, Getting the Whole Picture,"[2] I contrasted two ways of looking at things, saying that my scientific view and my Christian view complemented and enriched each other. Certainly many profound thinkers have contrasted the scientific way of looking at things with "the other way," Christian or not. C. P. Snow, of course, wrote a very famous essay on "The Two Cultures."[3] Later, in *The Two Cultures: and a Second Look*[4] he responded to criticisms by those who couldn't see themselves fitting into either of his two categories:

> I respect those arguments. The number 2 is a very dangerous number: that is why the dialectic is a dangerous process. Attempts to divide anything into two ought to be regarded with much suspicion. I have

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> thought a long time about going in for further refinements; but in the end I have decided against it. I was searching for something a little more than a dashing metaphor, a good deal less than a cultural map: and for those purposes the two cultures is about right, and subtilising any more would bring more disadvantages than it's worth. (p. 16)

Many Christians yearn for a world- and life-view that will provide a single, integrated viewpoint. I suspect that man is too complex for that.

In "A Biochemist Shares His Faith,"[5] I said that most of us recognize in ourselves two basic perspectives or dominant modes of thought, a subjective mode and an objective mode. That dichotomy still seems valid to me, resulting from our dual status as individual persons and members of our species. We can try to see ourselves either "from the inside" or "from the outside," as we would look to our fellow human creatures or to our Creator. And although in science we stress the objective mode, I think most of us acknowledge that we operate in both modes *both* as scientists and as Christians.

What I have come to see as divided into at least three parts is not the perspective from which we see ourselves, but what we see ourselves *as*. The model we use affects not only what we see but even what we mean by "seeing." To summarize my tentative conclusion in the most blatant oversimplification possible, I suggest that there are two basic alternatives to Man as Machine: they are Man as Animal; and Man as Spirit. It is the argument of this paper that the three models are equally valid, each representing a component of our human nature not to be neglected. A further argument is that we are unlikely to do much better, to combine them into some supermodel. That is, I suspect that the appropriate arena for synthesis, for wholeness, is human life itself rather than a highly refined philosophical view. In other words, as undissected persons, we serve as living models for each other. And, of course, Jesus Christ serves as the supreme model for Christians.

If Man as Machine is distasteful to some, I doubt that Man as Animal and as Spirit are any more tasteful to many. At least I tried to choose more neutral and more equally balanced terms than René Dubos used in his recent book, *Beast or Angel? Choices That Make Us Human.*[6] One suspects that Dubos is more comfortable with Man as Spirit than with Man as Animal. To indicate the opposite preference, I suppose he could have called his book "Highest Primate or Devil?"

Perhaps some terms for mental activities associated with the three models are less value-loaded than names for the models themselves. Thus, "thinking" is what we do like higher machines; sensation or "feeling" is what we share with higher animals; and "knowing" (in the sense of Michael Polanyi's "tacit knowledge" or perhaps of "moral conviction") is what we have in common with higher spirits. Although we recognize differences in these three ways of "seeing things," in some usages they are essentially interchangeable. I can say, "I think I'm having trouble getting my point across"; or, "I feel I'm having trouble getting my point across"; or, "I know I'm having trouble getting my point across."

Well, I sense that I'm having trouble getting my point across. What did Jesus mean when he said that the "great and first commandment" is to love the Lord our God with all our heart, and with all our soul, and with all our mind (Matthew 22:37-38, RSV)? I take it to mean that we are to love God with our whole selves, a composite of emotional, volitional, and intellectual elements.

Making Sense

I would like for this paper to be more than an elaborate play on words, but I confess that it began that way. I was musing on different ways of using our minds to "make sense," struck by the nuances of various words derived from the Latin *sensus* or *sentire* ("to feel, perceive"). I had been listening to my son's over-amplified rock music. To its driving beat, I responded with sympathetic vibrations of various motor connections of my central nervous system. A bit later, listening to music of my own choice, I found myself responding to a delicate baroque piece in an entirely different way. The contrast led me to dwell on the difference between amplitude and discrimination in sensory perception and brought the two words "sensuality" and "sensitivity" to mind. Later, my musically trained wife, trying once more to interest me in learning to play the piano, assured me that music should fascinate someone of my turn of mind because of the mathematical logic of its scales. In other words, music was also "sensible." Conceivably one could respond to a given piece of music in all three ways simultaneously: with a sensual or emotive response; with a sensitivity to the artistic perfection or "rightness" of the piece; and with an understanding of the "mechanism" of how the notes fit together, of their sequences and harmonic interactions.

Although I'm almost as tone-deaf in philosophy and psychology as in music, the three "senses" in which my mind could (at least theoretically) respond to a complex stimulus made immediate "sense" to me. I had a flashback to my nervous participation, years before, in a university faculty forum on the subject, "What is Truth?" Before my turn came to speak I had listened to an existentialist, a rationalist, and an empiricist each defend his own criteria for truth. Each showed that the other two were dead wrong—yet all three made sense to me. The existentialist sensed what was true from within himself, from his feeling for what was real at the moment. The rationalist distrusted changeable human feelings but had confidence in an enduring structure of reality he could sense beyond our human imperfections. The empiricist trusted neither his feelings nor revealed insights, but at least part of the world made sense to him because he could think of a way to test its truth (or rather, its falsity). In my stumbling synthesis, I commented that the three systems seemed to agree that truth is "that which endures" (if the "now" of the existentialist is taken as "the eternal present"). I said that as a Christian I saw Christ as the Truth, the Alpha and Omega unbounded either by time or by imperfection, yet available to us and inviting us to put him to the test by trusting in him.

I realize that I have used carelessly a number of terms whose precise definitions are important to various disciplines. I have also used some that are almost indefinable. "Spirit" is probably one such word. "Mind" may be another. In *What, Then, Is Man? A Symposium of Theology, Psychology, and Psychiatry*[7] Paul Meehl and his co-authors said in an appendix that the word "mind":

> . . . has become a synechdochical catch-all for almost everything psychic, intellectual, emotional, and whatnot. It may be regarded as a term which describes an aspect of the behavioral content, such as memory, consciousness, unconsciousness, knowledge, will, and feeling. Its use has become so broad that it may serve the person who believes that man has a soul as well as the one who does not. For definitive purposes the word has all but lost its value. (p. 320)

Yet the word "mind" was used throughout that excellent symposium volume! For an amateur it might be safer to copy Charles Reich[8] and refer to Models I, II, and III, and the perceptions associated with them. Whatever we call them, I think we lose something valuable from our human repertoire if we neglect any one of them.

If we fail to recognize our animal nature we are likely to play down emotional aspects of our life that stem from biological drives and needs. Our empathy capacity toward others may become attenuated, so that toward God as well as man we become "heartless." Also, we may forget that we occupy an ecological niche in a delicately balanced nature; to ignore our need for a biologically sustaining environment is to endanger our species as well as others. Neglect of our animal nature may cost us the experience of living in the simple present tense.

On the other hand, one thing that seems to distinguish us from other animal species is a kind of awareness of ourselves and of the possibility of self-conscious choices in our behavior. If we fail to cultivate moral sensitivity, we live on an animal level in the "now" and cut ourselves off from the past and future, let alone the eternal. If we lose the possibility of reasons for action, of reason itself, of ultimates from which we can reason, we become trapped in our immediate environment, unable to transcend it.

I suspect that until the rise of scientific thinking, these were the basic possibilities for human beings, either to be influenced by the immediate environment or to transcend it by rational or spiritual insights. There remains a third possibility: to change the environment. Even if technology arose from accidental discovery and was originally handed down by tradition, it led little by little to deliberate manipulation, to asking "What would happen if . . .?"—eventually to modern science.

Science has in common with the first outlook that it is grounded in the immediate phenomena of nature and in common with the second that it eventually provides a means of transcending nature with a theoretical structure. It differs from the first in its goal of impersonal objectivity and from the second in its focus on proximate rather than ultimate questions. It asks not "How do I feel about this?" or "Is it right?" but "Will it work?" It is concerned solely with a chain of cause-and-effect, with mechanics; when it deals with man it gives us a mechanical picture of ourselves. If we neglect it, we lose that much capacity to analyze critically, to predict behavior of persons and things, and to innovate.

Reductionism

Scientists are often accused of reductionistic thinking, perhaps rightly so. But it seems to me that reductionism is what you get in any of these outlooks if you neglect the other two. Much of modern American life looks to me like reductionistic hedonism. And a minister who says that the only important question is whether or not a person is saved is as much a reductionist as my biochemical colleague who used to insist that the only important questions are those that can be answered by quantitative experiments. Reductionism leads to chauvinism, in which proponents of a particular way of looking at reality defend it against all others. Finally we get to a kind of gnosticism in which one view is seen as accounting adequately for the others. We have seen scientists assume that man is nothing but a biochemical machine; argue that increasing the federal research budget is the only way to save the country and mankind; and explain away religious convictions as obviously the products of social channeling of biological responses. Some of us who are Christians have probably also seen our scientific curiosity and tentativity regarded as evidence of retarded spiritual growth.

Personal preference for one model over the others may be unavoidable, but all of us should beware of "nothing buttery," which is Donald MacKay's illustrative term for reductionism.[9] But even if we can't achieve a completely even balance individually, we can help provide balance collectively. Balance is particularly needed within the Christian community. Whatever danger of mechanistic reductionism exists outside, I suspect that within the church the mechanistic aspect is the one most likely to be neglected.

Two examples of its neglect come to mind. I recently read an autobiographical narrative written by an outstanding Christian woman. Throughout her book she emphasized love for God and man as "feeling," as hurting when others hurt. Theological scholars who hold orthodox doctrines without showing their own feelings upset her. Only once or twice in the entire book did she ask any questions about anything. Her only curiosity focused on her own emotions or on people she wanted to help, "What must they be feeling?" Any lapses into analytical thought, however, were attributed to her physical exhaustion, illness, or loneliness. She would get some rest or go have a pizza with a friend and her questions would go away. There is no doubt that she has been an effective witness for Jesus Christ. But is her witness a balanced one?

I have also recently seen a church go through a process of shaking out many of its most thoughtful members because loving God became limited in another direction. There it came to be defined as submitting to elders and "apostles" who "knew" God's will and who regarded honest questioning as Satan's way of dividing and attacking the church. No doubt these elders have been right about some things, at least on occasion. But is their church as whole as it should be?

There are certainly temptations to sin mechanistically. I doubt that they are greater than temptations to sin animalistically or spiritually, just different. Perhaps in our biological aspect we find it easiest to be selfish, to put our own needs above those of others. But it's also there that compassion for our own kind, and by extension to others, is most easily generated, along with the sheer joy of living as a creature in God's world. Our spiritual aspect may make us more susceptible to pride and rebellion, but it's also there that we acquire our moral responsibility, our sense of justice and protection for the oppressed. Perhaps thinking mechanistically does make faith more difficult for us, or at least more complicated. Yet it can also open for us new possibilities for imitating our Creator, for sharing his relationship to the world, and for continuing his work with our minds and hands. For machines, unlike animals and spirits, are put together by humans. To think of machines is to appreciate what it is like to be a creator, and to think of ourselves as machines is to appreciate more fully that we are God's created beings.

Being God's Machines

However, mechanistic thinking is relatively new, and that may make it harder for some Christians to accept. Science was developed in a systematic way long after both the Old and New Testaments were completed. The Bible shows concern for man's biological well-being along with his spiritual well-being. But there is very little analysis or technical detail. A case could be made that Jesus taught his disciples to question tradition, and that the kind of faith he engendered was a "try-it-and-see" kind of trust akin to experimentation. I won't try to make that case here. It's enough for me that Jesus told us to love God with all our minds. Whatever the mind set of his followers then, *our* minds are set by the culture in which we live to think mechanistically. We should abandon anything in our culture that gets in the way of our love for God, but everything else should be offered up to God in worship. Christians trained in science learn to worship God by thinking as well as by feeling and knowing.

Although I wish to pay due respect to the machine model of myself, I want it understood that I prefer the company of whole persons to that of machines. I am not likely to confuse the two, even though I once went so far as to give my Underwood typewriter co-author status on an essay about men and machines.[10] In another essay, "Whole People and Half Truths,"[11] I expressed my concern about the mechanization of human beings:

> In science, as in other fields, the machines we have increasingly come to rely on are highly complex, "almost human." But as machines take on more human attributes, we see human beings not freed to become more human, as we had hoped, but constrained to become more and more like machines. This mechanization of people seems to come not so much from understanding ourselves mechanistically as from competing among ourselves for the available resources. Machines perform sub-human tasks more efficiently than humans can. One makes a machine of himself simply by limiting himself to a single objective at a time. That is the way to "get things done." Competition forces us to that kind of efficiency. (p. 95)

We need not fear recognition of our machine nature, if we are God's machines. That should enable us to do God's will more skillfully and therefore even more responsibly and joyfully. It is when we let competition or the fear of it turn us into heartless, self-serving machines that the mechanistic picture becomes almost unbearable. I remember from my old economics textbook a description of that kind of model, the "economic man":

> . . . who is dominated exclusively by motives of loss and gain. He is represented as a kind of calculating machine, who measures all his actions in dollars and is governed by no other consideration. At least, he is so visualized by his critics. A truly economic man would budget his income in the most economical manner possible, so that he would always get the greatest possible value for his money and would never spend a dollar for one thing if he could get more utility by spending it for something else. Other things being equal, he would always buy every commodity at the lowest price for which it could be secured. As a business man, he would hire labor at the lowest possible wages and drive an equally hard bargain with all of those from whom he purchased materials or borrowed capital. He would produce those goods whose prices were highest, in proportion to the labor and capital employed, and would sell them to those who offered the highest prices.[12]

The same textbook said that most men are not economic in the extreme sense of that term, but that business men are probably more like the model than consumers or laborers:

> This is not because business men are any less susceptible to ordinary human emotions than other people, but the immediate objective of every business enterprise is to make profits, and all the activities of a business are means to this end . . . So, in deciding upon policies in the employment of men and in the marketing of their products, pecuniary loss or gain will be the most important and deciding factor, and they will buy where goods can be had at lowest prices and sell where they get the highest prices, all other things considered. Except in retail markets, where goods are sold to ultimate consumers, and in the labor market, where services are sold by individual workers, business men are the active parties on both sides of most price transactions. We will not be far wrong in assuming, therefore, that in such cases, consideration of loss and gain will have a predominant influence.[13]

That description of a man who is cold and amoral in his business dealings, forced by economic competition into a machine-like role, makes me glad I've been a biochemist instead of a business man. Although the Bible is not concerned with biochemistry or other sciences, at least my scientific thinking about biochemical mechanisms never seemed to separate me from God. I didn't worship biochemistry or build my whole life around it, so when God had other things for me to do, I could walk away from it. The Bible does say clearly that we cannot serve both God and mammon.

Finally, I know that many Christians are not satisfied with having to use multiple models to make sense of man. They regard the multiplicity as unwieldy and as untrue to man's unity as a created whole. They yearn for a world- and life-view that will provide a single, integrated viewpoint. I wish them well, but I suspect that man is too complex for that. But if we love the Lord our God with all our heart, and with all our

soul, and with all our mind, it seems to me that we will demonstrate our wholeness, if not individually as Christians, then collectively as the body of Christ.

REFERENCES

[1]Charles S. Pierce, "A Neglected Argument for the Reality of God," *Hibbert Journal* 7, 90-112 (1908); reprinted in *Values in a Universe of Chance*, ed. by Philip P. Wiener, Doubleday Anchor Books, 1958.

[2]W. R. Hearn, "Contra-Cyclops; or, Getting the Whole Picture," *Right On*, CWLF, Berkeley, September 1972.

[3]C. P. Snow, "The Two Cultures," *New Statesman*, 6, October 1956.

[4]C. P. Snow, *The Two Cultures: and a Second Look*, Mentor Books, 1959.

[5]W. R. Hearn, "A Biochemist Shares His Faith," in *Why I Am Still a Christian*, ed. by E. M. Blaiklock, Zondervan, 1971.

[6]Rene Dubos, *Beast or Angel? Choices That Makes Us Human*, Scribner's, 1974.

[7]Paul Meehl et al., *What, Then, Is Man? A Symposium of Theology, Psychology, and Psychiatry*, Concordia Publishing House, St. Louis, 1958.

[8]Charles Reich, *The Greening of America*, Random House, 1970.

[9]Donald M. MacKay, *The Clockwork Image*, InterVarsity Press, 1974, p. 21.

[10]W. R. Hearn, "Three Perspectives on Men and Machines. III," *Journal ASA* 22 (4), 136-7, December, 1970.

[11]W. R. Hearn, "Whole People and Half Truths," in *The Scientist and Ethical Decision*, ed. by Charles Hatfield, InterVarsity Press, 1973.

[12]Raymond T. Bye, *Principles of Economics*, F. S. Crofts and Co., 1941, p. 296.

[13]Raymond T. Bye, *op. cit.*, p. 297.

Coping with Being Human

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Various thinkers have given warnings of how different aspects of modern life destroy the personhood of individuals. Today, we encounter people on a daily basis who are physically and psychologically sick because of the inner distress produced by the difficulty of coping with being human. Insignificance of personhood, meaninglessness of daily life and the lack of the courage to be one's full human self dissipate our energy. Scientific achievements, man-made religious systems and philosophical thought still leave us yearning for inner peace and joy.

My patients and friends confirm in their lives that faith is the most helpful avenue to coping with life, faith that not only requires commitment to principle but also forms a dynamic relationship with the Creator of human beings.

Case Histories

"Doctor I just can't go on living this way. I've got to have help." Jean's cry is not an isolated cry of woe. Patients by the hundreds plead daily for answers to the human predicament. It is in this sense that the quandary of being human produces sickness in the whole personality. So with many patients I attend; they are unable to cope with being human. Jean's plight was physically real! Crampy abdominal pains, diarrhea and some bloody bowel movements constantly plagued her, especially when her emotional tension peaked. As we talked she exclaimed, "My husband comes home from the factory frustrated and tired. He dumps his anger and anxiety on me but never wants to hear of my day's activity. We get along well physically but I'm not just a body! I need real love and concern so I turn to my daughter for it." But what about Jean's abdominal pains and diarrhea? Under the emotional distress of her husband's dehumanizing attitude Jean is so sick that she cannot enjoy the physical blessings of marriage. In turn

her husband chafes in frustration. What a paradox! No wonder she's got to have help.

In the next examining room hunched on the table a young woman with head bowed, lips drawn together, fingers fidgeting with one another, reluctantly answers my questions. Carol talks in a weak, almost inaudible tone. I remarked to Carol that she appeared quite nervous, as if her insides were going sixty miles an hour but outwardly she was moving about six. "Do you have any questions, any problems?" I asked. "No, I have no problems! Everything is all right." After she filled out the medical history form, however, I noted that she smoked two packs of cigarettes and drank alcohol every day. She used to work but her husband doesn't want her to work so he works during the day and she stays at home. She doesn't go out much or associate with other people very often which compounds her dejection and depression, so she uses alcohol as an escape. As I talk with this young woman, she definitely displays a very poor self-image. She finds it difficult to communicate with others, fearing they will think she is worthless and insignificant. She tends to minimize problems and difficulties in order to keep people away from herself. She demanded a complete physical examination, and from this I wonder whether one of her preoccupations is the dread of death or some serious illness which nobody has uncovered. All of these symptoms occurring in such a young woman puzzled me. Then I found out that her father left shortly after her birth. Carol's mother gave her to her grandmother to be raised. Rejected and despised from birth Carol never found enough love and acceptance to develop a sense of significance and worth. Now it is clear that her physical problems express her inner distress.

In addition a middle-aged woman complained of recurrent attacks of abdominal pain. No organic disease appeared and finally she confided in me. "My husband is now in this third affair with another woman and that shatters me." One elderly man, as he was dying of terminal cancer became irritable and verbally abusive when a male orderly came into his room. Bill told me, "He will always find me and hurt me. He slaps me in the face and rubs my wound very hard." Bill had married a novitiate Catholic nun and thereby felt that he had defiled both her and God. "God was mad so he punished me by having a young man marry my daughter and thus I lost the only person I could truly love," he said. Now Bill finds that every young man who comes to care for him strives to punish him.

A young person came to the office because of rectal bleeding and abdominal cramps. As I began to obtain her history she suddenly cried out, "I'm afraid to die!" Overpowered by the fear of death her bowels literally cried blood. Later a patient with many physical problems expressed the same concern of the dread of death.

Astonishing as these cases may seem, my purpose in presenting them is not to prove that psychological problems can cause physical disease. Actually, I hope here to present to you the overwhelming evidence that apparently many people feel sick because of an inability to cope with being human. I expect the psychiatrist or a sympathetic family practitioneer to have a practice

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taken up largely with problems of living, but not a surgeon. So when I see patients I look beyond their physical complaints to help them identify and utilize their inner resources in order to get well.

These remarks are substantiated daily. "I was talking to Jane who has for years been driving her husband nuts because she frequently takes her pulse to make sure her heart is beating." "The fear of death," another says, "must be a national disease or a sign of the times that everyone is so preoccupied with what hurts." Again, "My energy level is so low that I really have to push to keep going. But I have so much to accomplish in life." Still another patient, "I do not sleep well but wake up frequently during the night. I have nightmares about death or being lost which wake me up. Then it takes me awhile for that fear to leave." One person admitted, "I think the lack of control of life's situations has led me to my fear of death."

Hear a few more patients who express how life dehumanizes them: "No matter how excitedly I told of my successes, Mother always found a vulnerable place to collapse my joy." "I wonder why Dad never remembered us kids after he left Mother?" In addition there was a college girl whom I operated upon for acute appendicitis and was found to be pregnant. "No one must know, not even my mother. She would never speak to me again and I couldn't live with that." So the coed went to a distant city for an abortion. Then came Susan who worked hard to get through college. She excitedly applied for a number of teaching jobs but none were open. Again the next year she sought a teaching post but none were available. "I have studied and wanted so much to teach. Now what will I do? What's life worth anyway?"

At this point Charlie comes in the office with recurrent peptic ulcers. No matter how his family doctor and I treat Charlie his ulcers clear up for only a few weeks at a time. Charlie has been a good faithful worker and his employer likes him. But seven years ago the administration changed hands. It was then that Charlie found out that he'd have to work another fifteen years to retire instead of five. Indigestion and abdominal pain started soon after that. Charlie said, "Everytime I go to work my stomach hurts and I can't eat; frequently I vomit." When he is off work and on vacation or sick-leave he feels fine and eats well.

The Predicament of Human Life

Upon deeper examination of each of these patients, many with several hours of consultation, I find uniformly that the whole predicament of human life is weighing upon them so heavily that they feel sick. Many of these patients have actual organic disease which has developed out of this inner distress. We must be careful to understand that somatic or bodily disease with signs and symptoms certainly can come from just plain psychological problems. Many of these patients when treated by various psychological techniques and psychiatrists are then able to work out

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their psychological difficulties in a normal way. Still they complain of an uneasiness, inner distress, and meaninglessness in life.

In the past few years I have been reading a number of books by world renowned scientists, theologians, philosophers and thinkers. I have attended a number of meetings in which the issues of human life project themselves most acutely in terms of individual self-worth, relationship to others and fulfillment in life. Seeing the same questions and problems manifest in my patients daily, I feel compelled to compile the facts and compose as much as possible the total picture in hopes of illuminating the ever developing problem of what it means to be human.

People on every hand puzzle the best of diagnostic abilities and create multiple problems for physicians. They present signs and symptoms of various diseases and yet no physical cause can be found. Disease of the inner person is produced by meaninglessness, hopelessness and the dread of death. As people formulate their own self-concept and understanding of the world about them they frequently are bewildered by anxiety, insignificance and inability to cope with the myriad of choices and opportunities forced upon them by our modern age. Throughout antiquity mankind has involved itself in external (meaning outside of oneself) support systems and situations which have produced behavior characteristic of what we can call today "the immediate person." Yet on every hand our lives are cluttered and we find various fragments of our life clashing in a display of emotions, feelings and intellect which fail to resolve accurately. Mankind has been harangued by an inner vacuum which has haunted it from birth to death. Largely, this inner meaninglessness has been exaggerated by the dread of death. People have confronted the major issues in life and have beautifully articulated the problems that stalk the human animal. But as René Dubos says in his Pulitzer prize winning book, *So Human an Animal,*[1] mankind has failed to advance inwardly and between persons since the stone age one hundred thousand years ago. Although civilization advanced remarkably in the last fifty to one hundred years, the inner development of man has flagged behind by centuries. For that matter, the advances in technology alone have created such a rapid change in the life of modern man that the range of choices made possible by scientific achievement so predominate that we experience the effects of over-choice on the individual and society.

"Who Am I?"

Alvin Toffler in *Future Shock*[2] points out that our astonishing blend of technological achievements has caused a transient society which presses the inner man for some semblance of permanence and control of his world. Toffler continues by emphasizing that to keep up with change requires so much time that people cannot think out where or why they are changing, and consequently writhe in the loss of a sense of belonging and a fear of self. Frequently I see people in the office, the hospital, and elsewhere asking the question, "Who am I?" This question saturates our conscious moments so that we grope for answers. Our world at times seems to be shattered and slanted. We feel spurned and we stumble trying to transcend the problems of being human today, which in the twentieth century is almost impossible. We yearn inwardly for breath to break out of the suffocating effects of this temporary world, which have confiscated our very being. What is life worth, why are we on the planet earth? All of these problems apparently create a motivating force within us to respond to our yearning for immortality, meaningfulness, hope, and self-worth. In the final analysis, however, we find the centuries of attempts to cope with being human have failed us even today. My perspective comes out of a rich experience with people both as a scientist and physician; people I have encountered in my practice of surgery, in the classroom, the laboratory, on the street and in their homes. The inability of people to cope with the human situation strikes me as never before. People admit to the destruction of their personhood, the worthlessness of life as a human being, the frequent intimidations and incriminations, and the exploitation by others. Humans suffer in captivity by machines, strivings for outer space, the helter skelter tempo of our modern day society for material possessions, fame, fortune and significance. People are bottled up and shipped about from state to state and at times country to country as if they were a bottle of soft drink. "How do I cope with being human?" is the cry of the multitudes. People not only suffer from psychological exploitation and physical disease, but even more from an inner vacuum. The cry of my eleven-year-old daughter as she was being coerced to behave according to parental guidelines resounds in the minds of all of us. "I'm only human."

A Point of Reference

Is there no answer then to our human quandary? How can we cope with being human? Carl Jung says that man needs a point of reference outside himself to understand himself. This means we must have faith: faith that there is a Person great enough to understand us, who sees meaning in our plight, and who will accept us as we are. Through faith in our Creator we can discover our ontology and destiny. Only Jesus Christ promises every one the courage to be fully human with inner peace, joy, love and self-control if we seek Him in faith.

What then is our hope? Since mankind has demonstrated the inadequacies of building external supports and experiences to make the inner man meaningful, we must necessarily have faith. I see faith as the only option left to humans whereby we can find the resources to become full human beings. It is by faith that we can comprehend and experience the Creator—the one being in the universe who gives human life meaning. Faith allows us the opportunity through Jesus Christ to cope with being human.

REFERENCES

[1]Dubos, René. *So Human an Animal.* Charles Scribner's Sons, 1968.

[2]Toffler, Alvin. *Future Shock.* Bantam Book, 1974.

Pitfalls for a Scientist's Motivation: The Poison and the Antidote

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The relevance of Christianity to the research scientist's basic motivations as well as his research ethics is examined. We first consider several commonly held aspects of a scientist's motivation and several possible motivational pitfalls. It is then stressed that an over-emphasis upon scientific freedom, with the consequent loss of scientific responsibility, may easily result in an imbalance between freedom and responsibility. Such an imbalance may occur if and when self-honor and self-glory become the dominant aspects of a scientist's or the scientific community's motivation. The tense historical setting of the development of nuclear physics just prior to the war is used to illustrate the possible distortions of ones motivation. Finally we consider how the historic Christian faith can help in evaluating motivational questions, and can aid the scientific community in maintaining a proper balance between scientific freedom and scientific responsibility.

One of the great responsibilities facing the Christian is the realization of a biblical perspective and its application to the endeavors of life. Scientists who are Christians must continuously wrestle with many questions. What difference does the historic Christian faith make in our lifework? How should Christianity affect our motivation and ethics in scientific activity? Can our faith aid us in resolving the dilemma between a scientific freedom which permits us to pursue knowledge without constraint and a scientific responsibility which may impose constraints upon the pursuit of knowledge?

In this paper we focus upon one possible pitfall which may distort a scientist's motivation to the extent that scientific responsibility is threatened. We then ask how a biblical perspective might well save us from the pitfall.

Much of the scientific community today realizes that science is not ethically neutral, nor is it an impersonal data-collecting affair. Both Christian and non-Christian scientists realize that a research ethics must be accepted by the scientific community as a whole in order for science to work at all. There is disagreement as to the basis for the needed ethics. A humanistic worldview insists upon a different source for ethics than does a Christian world-view. Yet despite a recognition for the need of ethics, very little time is spent during a scientist's training in examining the relevant ethical considerations, such as goals and an individual's motivation. This lack of reflection may unfortunately propagate erroneous standards adopted while a scientist was a student.

Some Particular Motivations

The motivation of a scientist is indeed complex and very much individualistic. Here we consider several possibilities for the source of motivation. This is not meant to be an exhaustive study. A recent report entitled *Scientific Freedom and Responsibility* published by the American Association for the Advancement of Science (AAAS) states that scientists are driven by a desire to know, a passion for knowledge.

> The central value for the most creative scientists is a passionate dedication to the advancement of knowledge, and to the solution of the baffling puzzles with which nature confronts us. The desire, for instance, to discover the principles underlying quantum phenomena at the atomic and subatomic level . . . has preoccupied some of the greatest scientific minds of this century. Such

> workers often live with their problems, day and night, for months or even years on end; the desire to solve a particular baffling problem may keep them preoccupied, to an extent that most other people can scarcely conceive. A deep sense of the beauty of science, and its aesthetic appeal, commonly accompanies this urge to solve difficult and fundamental problems[1]

I believe that there is truth in this analysis. Yet we wish to focus upon other desires.

In order to remain in the scientific community a researcher must establish himself as competent. Support in his field of research depends on this. Consequently there is a need for one to be tested and proved, and it follows that the successful researcher will be respected and honored. Such an evaluation will certainly have some influence upon the scientist's motivation and goals. Unfortunately in today's economic climate this real need is all too frequently worked out in the prescription "publish or perish". This need for proving oneself in the proper sense can rapidly be transformed into a desire for self-honor and glory.

The AAAS report does recognize difficulties in scientists' motivations which affect their research ethics. The report states,

> Many fields of research today are feverishly competitive, and some brilliant scientists are ruthlessly determined to get ahead of their competitors, sometimes by unscrupulous techniques.[2]

and,

> Scientists frequently exchange ideas and discuss with their colleagues the problems of their current work. Yet they have a strong sense of personal property in their original ideas and discoveries, which form the basis for their positions and prestige in the scientific world. Inevitably there are opportunities for conscious or unconscious theft of ideas; this can of course, give rise to intensely bitter feelings.[3]

An additional aspect of the present system of testing, proving, and honoring is a reward principle based upon priority of discovery, i.e., you must be the first to discover if you are to prove your worth. R. K. Merton has emphasized the importance of this reward principle:

> . . . the institution of science has developed an elaborate system for advocating rewards to those who variously live up to its norms. Of course this was not always so . . . Frances Bacon could explain and complain all in one by saying that 'it is enough to check the growth of science that efforts and labours in this field go unrewarded . . .[4]

Merton has also noted the extensive use of such honorific devices as eponymy, the practice of affixing the name of the scientist to his discovery. This practice is in part a recognition that the idea is the scientist's personal property. The AAAS study stated that,

> Recognition for original contribution is the chief reward and honor for the scientist in basic research; hence there are often passionate feelings about priority, which concern many of the greatest scientists as well as minor contributors.[5]

The report further suggested that such a reward is necessary in order to maintain the continuity of the scientific enterprise. But clearly there are many instances in which recognition is no small concern. And there are many cases in which a scientist lost the opportunity for significant recognition merely because his paper was a day or a week late at the desk of the publisher.

Bronowski's and Porter's Views

A different emphasis from that of the AAAS report can be illustrated by the thinking of J. Bronowski. Bronowski is certainly not one who minimizes the importance of knowledge. But in the final analysis he acknowledges that

> Science at last respects the scientist more than his theories; for by its nature it must prize the search above the discovery, and the thinking (and with it the thinker) above the thought. In the society of scientists each man, by the process of exploring for the truth, has earned a dignity more profound than his doctrine.[6]

Such a perspective has moved far from picturing science as a passionate dedication to the advancement of knowledge. Instead, the important goal is not for knowledge, but for the realization of the potential of man and honor for the individual. The driving element of the endeavor becomes a search for human dignity rather than for knowledge. We do not want to imply that man is to be minimized at the cost of knowledge. Clearly man, made in the image of God, is far more precious than mere fact. However we wish to point out that the central focus of Bronowski's concept of science is one which exalts man, and such a view in its extreme will surely influence the basic motivation behind the endeavor.

A somewhat similar motivational aspect attempting to justify science is that of George Porter. Porter wishes to discover man's purpose through scientific study, and if only science can find this purpose, one has a driving motivation for engaging in scientific research.[7] Science becomes the medium, not to realize our humanness as in Bronowski's view, but to find it.

Perversion of Motivations

If the endeavor of science is either to pursue knowledge or to better man's lot, or even to behold the aesthetic beauty of nature, what constructive role is played by such attitudes as fierce competition, the consideration of ideas as personal property, passionate feelings about priority, and a desire to earn dignity? Are these elements at all consistent with what we claim science to be, or with what it *should* be? Again we recognize that a scientist's work must be evaluated, and therefore recognized; honor and prestige must naturally follow. But is there not a qualitative distinction between a proper honor and recognition given as a reward, and that which is searched after out of a selfish motivation, i.e., out of self-interest? My concern is that the pressures within the scientific community, within the ways in which we teach and the manner in which we evaluate, may lead one to a search for selfish self-glory and self-praise. The scientist becomes engaged in proving that he is smarter and more capable than anyone else! Or science becomes a tool by which the individual seeks to find his dignity or worth. The more pure and idealistic goals of science are replaced by a desire to glorify both self and the entire community of which we are a part.

Because of the sinful nature of mankind, we must recognize that it is indeed difficult to maintain the needed evaluation, recognition, honor, and reward, without simultaneously inciting a selfish drive in both the individual and the scientific community as well. This pitfall is a natural one and a very serious one. We are not saying that all of science presently suffers from such an evil. We merely warn of it and consider the possible consequences. Later we consider the antidote.

The impact of this motivational deviation may have very serious consequences. We have already seen that attitudes within the community can affect its focus, its direction, and its ethics. Today and in the foreseeable future we are continually facing situations in which we must choose between freedom to pursue research and the imposition of constraints designed to assure responsibility. This is sort of a freedom/responsibility dilemma. Our thesis is that if self-honor and self-glory become dominant in our motivation, the result will be an over-emphasis upon scientific freedom with a consequent loss in scientific responsibility. The dilemma is polarized from a balance which promotes good science to a freedom that is destructive because it is self-centered.

Nuclear Physics As An Example

The development of nuclear physics in the shadow of World War II illustrates the difficulty of determining and maintaining an appropriate balance in a freedom/responsibility dilemma. It also well illustrates the influence that recognition, prestige, and honor can have upon the community in affecting its judgment of this balance, as well as the frustrating tendency for such to end in self-glorification. To understand the situation, let me briefly summarize the events. Extensive use has been made of S. R. Weart's analysis in "Scientists with a Secret"[8] and that of W. Heisenberg.[9]

In the mid to late thirties the rapid growth of nuclear physics gave rise to the hope of transforming our technology, but also hinted of the threat of an enormous new source of energy useful in weapons. In Weart's words:

> What are physicists to do if they make a discovery that promises to transform industry but also threatens to revolutionize warfare? Should they investigate the phenomenon within their traditions of free and open inquiry or keep the deadly secret to themselves? This was the dilemma that was faced by several groups of physicists who studied uranium fission in 1939 and 1940.[10]

With the imminence of war, the ethical dilemma to be faced could well be characterized as a choice between freedom and responsibility. And many of the physicists active in nuclear research had themselves already witnessed first hand the Fascist threat.

Joliot and Curie in France, and Fermi in Italy had carefully studied natural radioactivity since 1934. But even as late as 1938 it was not yet known whether or not a nuclear chain reaction was *in principle* possible. Unknown were several crucial questions. Were neutrons emitted during uranium fission, and if so, how many? What was the cross section for neutrons on carbon? Would carbon make a good moderator?

The suggestion to limit freedom of publication was evidently made first by Leo Szilard, a Hungarian physicist who had escaped the early Nazi persecution of Jews. After realizing the implications of his work, he evidently first tried to patent his ideas to control their use. He then started a major effort to awaken the scientific community involved in nuclear research to the importance of secrecy. In response to Szilard's efforts, the British scientists felt that such a step was not warranted:

> Even those scientists who felt most keenly the responsibility of scientists for the consequences of their discoveries traditionally felt that secrecy is abhorrent and that interference with the normal process of open criticism would not only impede scientific progress but pervert it.[11]

One can understand their criticism. After being rebuffed by the British, Szilard tried to persuade Enrico Fermi, then at Columbia University, of the dangers. But Fermi decided that fission was quite unlikely. His response to Szilard's concern was "Nuts!", a reply somewhat anticipated by Szilard, who had earlier said, "Unfortunately it will appear to many people premature to take some action until it will be too late to take any action."[12]

Experiments were then conducted to determine whether or not neutrons were indeed liberated when uranium nuclei fission. It turns out that only two groups were working on this problem, one American and one French. Neither group wanted to withhold publication because they thought other groups would beat them to it. With the discovery of a positive result, that about two neutrons were indeed liberated making fission possible, the implications were obvious. Yet Weart notes, "Despite their concern over this, [that world war was inevitable] the physicists sent their papers to the *Physical Review* the next day."[13] But Szilard soon appealed to Fermi to delay publication. However "Fermi was repelled by this idea, holding that publication was basic to scientific morality." Finally, only after the majority of his group agreed with Szilard, Fermi withheld publication. The argument raged on within Columbia, and the attitude of many, as reported by Weart was that "an attempt to restrict publication was both futile and an undesirable breach of scientific custom."[14]

A tentative agreement specifically designed to certify priority was reached: articles would be submitted to the *Physical Review* for dating, but withheld from publication. They would be circulated privately. It is interesting that E. P. Wigner noted the asymmetry created by having only American scientists withhold publication and not also European scientists. He evidently saw this as an unwarranted prejudice in favor of the American scientists![15] And it should be noted that Niels Bohr still very much doubted that "fission

The rapid consequence of selfish motivations will surely be a loss of scientific responsibility. We can be sure that these choices between freedom and responsibility lie at our door.

could be used to cause a devastating explosion."

Although the restriction of circulation of research in the West was well begun, the French were to make this attempt fail. Joliot, believing in "the international fellowship of scientists," felt that they had little sympathy with secrecy, *and* if "his colleagues failed to publish, they would be eclipsed by those who did."[16] So Joliot cabled Columbia that they were publishing; the Columbia group then also published.

By this time the Briggs committee had been formed, with Albert Einstein as one of its members. Szilard tried to work with this committee. Recognizing the attitude of the Columbia group, Szilard tried to propose some compensation, financial or otherwise, for the younger physicist who was not to be permitted to publish. He stated

> For a physicist, who has not yet made a name for himself, refraining from publication means a sacrifice which he should not be asked to make without being offered some compensation.[17]

Meanwhile Anderson and Fermi had measured the cross section for neutrons on carbon, and found that it would make a good moderator. Again Szilard approached Fermi to withhold publication. "Fermi really lost his temper; he really thought that this was absurd," said Szilard.[18] But in fact the publication was withheld, and Weart evaluates the seriousness of this choice as follows:

> If the value for the carbon cross section had been published, the course of World War II might concievably have been changed. For German scientists . . . wrongly concluded that carbon had a substantial neutron absorption cross section. From that point on they abandoned carbon as moderator . . . Anderson and Fermi's work could have put all these groups on a different track.[19]

Heisenberg has acknowledged that this was indeed the case. He states,

> Previously, i.e., toward the end of 1939, I had suspected, for theoretical reasons, that carbon could be used as the moderator in the place of heavy water. However, a measurement of the absorptive power of carbon had erroneously led to too high a value. Since this measurement had been made in another well-known institute, we had not bothered to repeat it and so had abandoned the whole idea prematurely.[20]

Anderson's and Fermi's measurement would have surely put the Germans back on the right track.

An elaborate self-censorship was finally to be set up. The substantial shift in attitude can be illustrated by that of Lawrence: "As recently as six months ago, . . . I should have been opposed to any such procedure [of restriction], but I feel now that we are in many respects essentially on a war basis."[21] The scientific community did finally modify its operating principle.

Not a Simple Issue

From this drama what can be learned about the motivational concerns which we have raised? By no means can we conclude that the question of imposition of restrictions on publication was, or ever will be a simple issue. There were certainly compelling arguments against restrictions. However throughout the events which we have outlined there appears to have been an adamant rejection of restrictions. This adamancy was based in part upon an insistence on the need to establish priority of discovery as well as the desire to have one's work recognized. In many, but not all cases, even wellknown scientists refused to have their work eclipsed by others. Even the initial prescription to establish priority was not acceptable. As we have earlier stated, recognition, prestige, and honor are to be expected and are appropriate. However in light of the seriousness of the situation, a seriousness which was indeed acknowledged by the scientific community, one must ask whether or not personal self-establishment and glory were too strongly emphasized.

Secondly we note that the attitude of a few physicists who insisted on the freedom to publish clearly pressured others into abandoning restraints. This pressure was not necessarily done consciously, but was nevertheless effective. One can see how the attitude of a few researchers can well affect the stand taken by the entire community.

Thirdly it is clear that many physicists opposed restraints because they incorrectly evaluated the possibility for realization of the chain reaction, e.g. Niels Bohr. The error in judgment was certainly an honest mistake, but it resulted in underestimating the very nature of the threat and caused an over emphasis upon scientific freedom. The freedom they wished may well have been warranted in light of the outcome they expected, but it was not warranted by what actually transpired. This is a clear warning that any freedom/responsibility balance based upon our present understanding may well prove to be lopsided due to the blindness of our perspective.

A further difficulty illustrated by this drama might be noted. It is the great resistance met when attempts are made to arrest the direction and progress of successful research. In Henry Stob's words,

> One feature of science . . is its apparent inability to arrest its own momentum and to stop short of putting into practice the knowledge and skills it has acquired. This is another way of saying, I suppose, that knowledge, for most members of the scientific community, is never merely for contemplation but also for utility.[22]

It is easy to see how such a momentum may well be enhanced when desires of self-glory are dominant.

Christian Guidelines

How can the historic Christian faith help us evaluate motivational questions and resolve freedom/responsibility dilemmas? Firstly I do not see how a motivational drive focused upon self-establishment and self-glory can be made consistent with a Christian worldview. For does the latter not directly oppose the search for magnifying self? We must recognize the needs for recognition, prestige, and honor in the scientific community, for they are the outcome of needed testing and proving. But these necessary rewards when adamantly sought by the individual, or when adopted as the *end purpose* of scientific activity can lead only to the pitfalls and corruptions that we have outlined. Not only is the individual frustrated, but the responsibility of the scientific community can be undermined, perhaps even forgotten. In the end, one can see a realization of C. S. Lewis' *That Hideous Strength* with

all the blindness and self-rationalizations of its individuals. Christianity rejects an exclusive emphasis upon self.

Secondly a Christian perspective not only rejects such a defective motivation, it also provides a positive one in its place. A balanced biblical outlook will turn our efforts from seeking self-glory to seeking the glory of God. We must seek to glorify our Lord, a part of which will engage us in serving Him, His creatures, and subduing His creation. This does not mean that we find our meaning in nature. Our great task is to understand in what manner we can glorify God in all that we do. Part of this task is to keep our motivation pure. (Colossians 3:23)

Such a biblical perspective is not new to science. For instance R. K. Merton has recognized a positive motivational influence in the Puritan scientists. In them Christianity produced a *disinterested* zeal in the pursuit of knowledge. Let me quote Merton.

> What we call the Protestant ethic was at once a direct expression of dominant values and an independent source of new motivation. It not only led men into particular paths of activity, it exerted a constant pressure for unswerving devotion to this activity. Its ascetic imperatives established a broad base for scientific inquiry, dignifying, exalting, consecrating such inquiry. If the scientist had hitherto found the search for truth its own reward, he now had further grounds for disinterested zeal in this pursuit.[23]

We also have examples of scientists who have opposed the glorifying of mankind, and who sought to glorify God. For instance Boyle pleaded with the Royal Society in his last will and testament as follows:

> Wishing them also a happy success in their laudable Attempts, to discover the true Nature of the Works of God; and praying that they and all other Searchers into Physical Truths, may Cordially refer their Attainments to the Glory and the Great Author of Nature, and to the Comfort of Mankind.[24]

Similarly R. Hooykaas has noted the impact of Christianity upon the early Protestant scientists. He states,

> The central theme of Reformed theology was 'the glory of God.' Kepler wrote in 1598 that the astronomers, as priests of God to the book of nature, ought to keep in their minds not the glory of their own intellect, but the glory of God above everything else. The Netherlands' Confession emphasized that nature is 'before our eyes as a beautiful book, in which all created things, large or small, are as letters showing the invisible things of God.'[25]

Such an attitude can both properly motivate us in pursuing scientific studies and guard us from pitfalls of self-deception or self-pride.[26]

Summary

It is not my intention to draw an overly critical and pessimistic picture either of science in general, or of the drama that we have considered. We can indeed be thankful that God, because of his general grace upon mankind, has allowed the unbeliever as well as the believing scientist to frequently escape these pitfalls at least in part. But we must caution against assuming that the scientific community is guaranteed such an ability to escape this pitfall. Furthermore, a rapid consequence of selfish motivations will surely be a loss of scientific responsibility. We can be sure that these choices [between freedom and responsibility] lie at our door. And unfortunately the consequences of an error may well be neither desirable nor reversible. Luckily, or more accurately providentially, the needed restrictions were made in time in 1940.

REFERENCES

[1] *Scientific Freedom and Responsibility,* A Report of the American Association for the Advancement of Science Committee on Scientific Freedom and Responsibility, prep. by J. T. Edsall, (AAAS: Washington; 1975), pp. 6-7.

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

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

[4] R. K. Merton, *The Sociology of Science, Theoretical and Empirical Investigations.* (Univ. of Chicago Press: Chicago; 1973), p. 228.

[5] *Scientific Freedom, op. cit.*, p. 10.

[6] J. Bronowski, *Science and Human Values,* rev. ed. (Harper Torchbooks: New York; 1965), p. 64.

[7] George Porter, "Relevance of Science", *Journal Amer. Sci. Affil.*, March 1976, p. 3. This issue also contains an analysis of Porter's perspective. In this paper we cannot analyze this perspective except to note that it forces the motivations to concentrate upon self.

[8] S. R. Weart, "Scientists with a Secret", *Physics Today,* Vol. 29, No. 2, (Feb. 1976), pp. 23-30. If not expressly indicated, all quotations are from this article.

[9] W. Heisenberg, *Physics and Beyond.* We shall refer particularly to Chapt. 14, "Individual Behavior in the Face of Political Disaster (1937-1941).

[10] S. R. Weart, *op. cit.*, p. 23.

[11] *Idem.*

[12] *Idem.*, from Szilard papers, La Jolla, Calif.

[13] *Ibid.*, p. 25.

[14] *Ibid.*, p. 26.

[15] *Idem.* Clearly such a concern is in opposition to any self-centeredness,. even a national self-centeredness.

[16] *Ibid.*, p. 28.

[17] *Ibid.*, p. 29.

[18] *Idem.*

[19] *Idem.*

[20] W. Heisenberg, *op. cit.*, p. 180.

[21] S. R. Weart, *op. cit.*, p. 30.

[22] Henry Stob, "Christian Ethics and Scientific Control", *The Scientist and Ethical Decision,* C. Hatfield, ed., (Inter Varsity Press: Downers Grove; 1973), p. 18.

[23] R. K. Merton, *op. cit.*, p. 228.

[24] *Ibid.*, pp. 234-235, as quoted from Boyle's last will and testament.

[25] R. Hooykaas, *Religion and the Rise of Modern Science,* (Eerdmans: Grand Rapids; 1972), p. 105.

[26] It is interesting to note that the early Protestant scientists were not free from motivational concerns or pitfalls, as is evidenced by both Boyle's statement and the concern for Kepler. We also note that their understanding of what science should be is remarkably similar to the positive elements of the AAAS statement (See the quotation of Note 1).

Some thoughts on the nature of persons . . . and the purpose of the Christian church

1 + 1 = Organization

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In the black folk drama *Green Pastures* God says, "I'm lonely, I think I'll make me a man". And so the first organization was born. By organization we mean two or more persons deliberately brought together for a specific purpose. God and his man Adam were the first organization. They were brought together to work toward a specific goal, i.e., to reduce the loneliness of God.

The second organization, Eve and Adam, Inc., was not unlike the first. It too was designed to assuage loneliness. Note Genesis 2:18: "And the Lord God said, 'It is not good that man should be alone; I will make him a helper fit for him' " (RSV). This organization was also designed for work:

> And God blessed them, and God said to them, "Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth." (Genesis 1:28, RSV)

Fellowship and dominion: these were the goals of the second organization.

My thesis is: What was true of the first persons is true for all. Persons were made for organizations. It is their nature to be a part of organizations. They realize their personhood through participation in organizations. In fact, it could be said, "Nobody is anybody unless he/she is a part of an organization." In organizational relationships were persons created and so shall they remain to the end of time. They *are* the organizational roles they play, no more, no less.

Implications of the Organizational Hypothesis

This organizational hypothesis clearly locates human nature in relationships with other persons rather than inside individuals. Gordon Allport (1937), in discussing the history of the study of personality, noted that the word *persona* in ancient Greece referred either to the masks worn by the actor in the play or to the actor himself offstage. A person could play many parts and wear many masks. On the other hand, the person was the mask he wore and, since he wore no mask offstage, he was at that point, by definition, *no* person. The thesis that persons were made for organizations strongly affirms this latter position, i.e., that persons are the roles they play. Adam was not Adam apart from his role in God's loneliness organization or his role with Eve in fellowship and dominion.

Thus individualism is illusory, if not epiphenomenal. The real essence of personhood is in relationships with other persons. John Donne put it far too mildly in his understatement, "No man is an island." Rousseau's fictional child Emile would have been no one at all, instead of the ideal man Rousseau envisioned, had Emile been reared in the forests away from persons and from Paris. There is no human nature deep within us waiting to be released from the oppression of society, culture and organizations. Who we are is who we have become in relationships. We are the roles we play. We are the organizations of which we have been members. It is our destiny and our essence to be related. Even Nietzsche's superman was inextricably bound to play a counterdependent role with his fellow man. This was also true of Kierkegaard, who preposterously deigned to call himself "that individual." There was and is no such person!

Charles Cooley (1902) suggested the term "looking glass self" for his proposal that we do not know who we are until we see ourselves reflected in the perceptions of other persons. He said, "Each to each a looking glass reflects the other that doth pass." Therefore basic identity is not personal as much as it is reflective. "Tell me who I am" is an appropriate question. It implies that who I am for you is the basis of my own self-understanding.

Harry Stack Sullivan (1953) suggested that personality exists *between* us rather than *in* us. It is "interpersonal" in contrast to "individual." By this he meant that character is a specific style of relating to other persons. It is expressed and observed in interpersonal

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interaction. It does not exist at all when a person is not relating. Further, when it does appear, personality is out there between us, never within us. It exists in the space between persons and should never be thought of as residing inside them. Personality is social.

Erick Erickson (1950) characterized the ego crisis of the adolescent period as one of finding identity versus remaining in role diffusion and confusion. Finding identity implies finding a role to play. The role should fit in with the opportunities offered by one's culture at the same time that it should incorporate the inner dynamics of one's personal history. At its narrowest, this means that youth may choose only those vocations open to them. They cannot be Indian chiefs, medicine men or canoe builders if they do not live where these are options. At its broadest, it means that if youth desires new vocations they must find persons to affirm those roles, or they will not survive. This is vividly illustrated in Erikson's psychohistory of Martin Luther (1958) in which he grounds Luther's creative attempt at reformation in the efforts of the German princes to assert themselves.

Thus Cooley's "looking glass self" theory of basic identity, Sullivan's interpersonal theory of personality and Erikson's theory of the cultural foundation for role identity, all lend support to the view that the nature of persons is social. It is but a small step from these views to the present hypothesis, that human nature is organizational.

One final implication is noteworthy. Since the time of Plato cognition or reason has characteristically been preferred to feelings or volitions. Philosophers in Plato's *Republic* were to be the rulers because they could reason from principles and would not be susceptible to the passions of soldiers or the emotions of the slaves. The implicit assumption underlying this tripartite division of human faculties was that the emotions and the will could be easily swayed by crowd influence.

These ideas have pervaded most western thinking. Mentally ill persons were defined as those who became irrational, i.e. who would not listen to reason. Those thought to be most human were those who could resist crowd pressure and reason on their own. To be abnormal meant to give in to social pressure and irrationalism, whether in the form of authority or emotion.

Social groups became suspect. People lost their reason when too many of them got together. Gustav Le Bon, in writing the first book on social psychology, *The Crowd* (1895), clearly affirmed this position. He noted that persons in groups behave irrationally. They must be controlled by wise leaders who themselves are controlled by the ability to reason on the basis of principles.

The relation between persons in groups and a negative evaluation of all that was not rational led to the name of one of American psychology's first journals, *The Journal of Abnormal and Social Psychology*.

The organizational thesis of this paper finds the connection between groups and abnormality to be a spurious one. It is gratifying to note that the American Psychological Association corrected this hangover from Plato in 1951 by separating abnormal from social psychology. There are now two journals: *The Journal of Abnormal Psychology* and *The Journal of Personality and Social Psychology*. No longer is it thought that there is a necessary relationship between social events and abnormal behavior. The title *Personality and Social Psychology* attests to the now acknowledged relationship between the nature of persons (i.e. their personality) and their experiences with others (i.e. their social groups).

The Christian church is the organization par excellence. *It alone offers persons their nature in a way that assures them they will never have to go seeking it again.*

Of course, the presumption that human nature is organizational goes one step further. Whereas much psychology would opt for an interactionist position (i.e. the view that human nature is a function of both individuality and social experience), the organizational thesis takes the viewpoint that personality is entirely social and that individualism is only a reflective epiphenomenon. In point of sequence therefore, human nature is a function first of feelings and strivings resulting from group relationships. It comes, after a time, to have a rational component. The central value of group experience in determining true personhood is affirmed.

How Do Organizations Fulfil Human Nature?

Sigmund Freud said that the ideal person (genital character) was characterized by having someone to love and something to do (*lieben und arbeiten*). Contemporary reality therapy bases its whole approach on an updating of these two themes. These therapists explicitly assist persons in finding jobs and other persons for whom they can care. Joseph Addison added a third ingredient: "something to hope for". So it might be said that human beings are those who love and who work and who hope. This is what it means to be a person.

What have organizations to do with these three? Plenty, they are those social groups who throughout history have intentionally pursued these ends. If persons have found love, work and hope outside organizations, they have done so only rarely, incidentally and to a small degree.

Earlier I said that organizations were groups of persons deliberately brought together to achieve a goal. What are the *goals* of organizations? Behind each organizational goal lies a human need. So the goal of any organization is to meet human needs. God had a need: to reduce his loneliness. So he created an organization. Persons need to get from one place to another; so a bus company is formed. Persons need to know what others are thinking; so a teletype company is organized. Persons need to keep warm; so a heating company arises. People need to see at night; so an electric utility company is formed. All organizations are directed toward meeting human needs. If they cease to meet needs or to make a contribution, they go out of business.

Implicitly, organizations have always attempted to meet two kinds of human needs, i.e. general and personal. *General* needs are needs for clothing, transpor-

tation, education, communication, etc. *Personal* needs are the need for love, work, and hope. These last are the needs to realize one's human nature, to find identity and status.

I said implicitly, because explicitly organizations have often attended to general needs and forgotten the personal ones. This has led many thinkers, Karl Marx being one of the first, to criticize organizations because they treated persons as things, i.e. they dehumanized people. Ideally, organizations have not forgotten the personal needs of individuals. They have sought to meet everybody's need for love, work, and hope. At the least, this makes for happy employees. At best, personal fulfillment is seen as equal in importance to producing a product.

As has been said, all organizations do, in fact, implicitly function to meet both general and personal needs. Some organizations are explicit about it. Take for example these two statements of company policy:

1. The company aims to be a successful business which lives out its concern for the dignity and worth of its members as it pursues profits. To accomplish this, the company will attempt to operate in such a way as to:

   accept people as they are,
   expect responsible behavior,
   support individuals and personal growth,
   assist individuals to develop their competencies,
   enlarge the opportunity for impact of each individual in the company in every practical way,
   bend every effort to resolve conflicts through discussions and fair judgment, minimizing arbitrary rules and the use of authority.

2. We have two basic aims: One is to make products which are genuinely new and useful to the public, products of the highest quality and at reasonable cost. In this way we assure the financial success of the company and each of us has the satisfaction of helping to make a creative contribution to the society. The other is to give everyone working for the company a personal opportunity within the company for full exercise of his talents: to express his opinions, to share in the progress of the company as far as his capacities permit, to earn enough money so that the need for earning more will not always be the first thing on his mind—opportunity, in short, to make his work here a fully rewarding and important part of his life.

   (Beckhard, 1969, p. 119)

Organizations *can* function to fulfil persons at the same time that they produce efficiently. Profits and persons can go together.

This is what organizations have to do with the nature of persons. Organizations do for persons what they in no way can do for themselves. They give them roles to play and a set of futures in which to put their trust. This is true whether the organization is marriage, Rotary International, the local plant, a chess club, the national government, Bell Telephone Company, or the Christian church. Persons join organizations because it is their nature to seek love, work and hope. These are things they cannot provide for themselves.

As has been said (Lawrence and Lorsch, 1969), "organizations are the central facts of modern life. They serve as crucial mediators between the individual and the entire society" (p. 99). They are, and always have been, the primary channels or means through which persons realize their natures and discover their identities.

Some might criticize this idea because it emphasizes what persons do rather than what they are. Let it be remembered that the position taken here is that persons *are* what they do. They are *non*-persons apart from their roles in the organizations to which they belong. Who am I apart from my roles as father, citizen, teacher, psychologist, mountain climber, Christian, swimmer, and scientist? No one! And all these are roles I have achieved through participation in organizations. So the answer is yes, the organizational hypothesis does emphasize what people do as opposed to what they are. People are what they have achieved in life, not what they are in themselves.

The Christian Church: Organization *par Excellence*

In regard to the distinction between what people are and what they do, Sarbin (1970) compared *achieved* with *ascribed* status. Understanding this difference clarifies why the Christian church does for persons what no other organization can.

The organizational hypothesis proposed here asserts that persons are what they do or have achieved. However, there are roles which are given to persons, or ascribed to them, apart from anything they did to deserve or obtain them. By birth one becomes a son or daughter, black or white, citizen of the USA or Mexico, a neighbor in one community or another. Do these not give identity (i.e. meet the need for love, work and hope) just because they are ascribed or unearned? Are these roles not as important as any that can be achieved, particularly if that ascribed identity is that of a child of God? (Galatians 3:16)

The answer is *yes*. Yes, in spite of the fact that much love, work and hope come from those roles we achieve. Yes, in spite of the fact that what most organizations offer is a chance to work for identity. Yes, in spite of the fact that the status that comes from ascribed roles is given without any effort at all. All one has to do is accept ascribed roles and believe that they are true.

But perhaps the most crucial reasons ascribed roles are important is that achieved roles have a way of fading and passing away. Etzioni (1964) says that one of the chief characteristics of organizations is that in them persons are expendable. This means that when a worker doesn't do the job as well as he/she once did, that person can and will be replaced. If one gets sick or grows old, the organization will put somebody else in charge of doing the job. What then happens to the love, the work and the hope one has achieved? Where does this achieved status go when one is fired or retired? Achieved identity is no more stable than the present moment.

One can look at the crises in roles in terms of different kinds of threats. Just as the two types of roles are ascribed and achieved, so threats to these roles come in two kinds, i.e. developmental and accidental threats.

Developmental threats are those events one expects to happen if one lives long enough. They are part of the natural developmental process. For example, one expects to retire at age 65; one expects for children to grow up and marry; one expects to not play football

when he turns 50 years old. These are developmental threats to both ascribed and achieved roles.

Accidental threats are the unexpected, tragic, premature, unplanned for events one hopes to avoid or bypass. For example, the death of a baby child; an automobile accident that cripples one; being fired from a job; or a divorce. These are accidental threats to both ascribed and achieved roles.

Suffice it to say, the essence of personhood, i.e. the roles we play in organizations, can be taken away. What happens to persons then? Do they lose their human nature? Yes, if we take as an absolute the thesis with which this paper began, that there are no persons apart from their roles. But no, if there is a role that cannot be lost, no matter what. Yes, if all a person has is the love, work, and hope that comes from roles that can be easily filled by others. No, if there is an identity which stems from an organization made up entirely of ascribed roles. Yes, if one is only what one does. No, if there is a status that comes entirely from acceptance or faith.

This is where the Christian church comes in. It offers an identity that cannot be lost and it is an organization made up entirely by ascription. Nobody earns his or her role in it. It is the organization *par excellence*. A person simply joins and accepts a role as child in the family of God.

I began by talking about the first two organizations in history, i.e. 1) God and Adam, and 2) Adam and Eve. The third and the fourth organizations were likewise dependent on God's initiation. It was He who established the children of Israel and the church of our Lord Jesus Christ. The goals were much the same as before: fellowship and dominion. In each case He offered membership that was not based in any way on achievement. It was and is an ascribed, not an achieved, role.

Concerning Israel, note the words of the Deuteronomic Covenant proclaimed to the Hebrews shortly after they had conquered Jericho and settled in Caanan:

> For you are a people holy to the Lord your God; the Lord you God has chosen you to be a people for his own possession, out of all the peoples that are on the face of the earth. It was not because you were more in number than any other people that the Lord set his love upon you and chose you, for you were the fewest of all peoples; but it is because the Lord loves you, and is keeping the oath which he swore to your fathers, that the Lord has brought you out with a mighty hand, and redeemed you from the house of bondage, from the hand of Pharaoh king of Egypt. Know therefore that the Lord your God is God, the faithful God who keeps covenant and steadfast love with those who love him and keep his commandments, to a thousand generations, . . . (Deuteronomy 7:6-9, RSV)

Concerning the church, note again the words of Jesus immediately after Peter had confessed, "thou art the Christ, son of the living God":

> And Jesus answered him, "Blessed are you, Simon Bar-Jona! For flesh and blood has not revealed this to you, but my Father who is in heaven. And I tell you, you are Peter, and on this rock I will build my church, and the powers of death shall not prevail against it. (Matthew 16:17-18, RSV)

Paul explained the meaning of Jesus' promise many times. These words to the church at Ephesus are but one example:

> But God, who is rich in mercy, out of the great love with which he loved us, even when we were dead through our trespasses, made us alive together with Christ (by grace you have been saved), and raised us up with him, and made us sit with him in the heavenly places in Christ Jesus, that in the coming ages he might show the immeasurable riches of his grace in kindness toward us in Christ Jesus. For by grace you have been saved through faith; and this is not your own doing, it is the gift of God—not because of works, lest any man should boast. For we are his workmanship, created in Christ Jesus for good works, which God prepared beforehand, that we should walk in them. (Ephesians 2:4-10, RSV)

The *role in* both the community of the children of Israel and its successor the community of the New Covenant, the Christian church, is ascribed (given freely) without cost. Persons don't have to work for or achieve this identity. It is freely offered to them simply for the asking and the receiving. As Paul Tillich said, "You are accepted; accept your acceptance" (1948).

Remember Jesus said to Peter, ". . . the powers of death shall not prevail against it". This means that all threats to the status given by faith will not be successful. A person may get sick and lose his or her job at the plant. Children may grow up, leave home, and leave a mother not knowing what to do with herself. Retirement may be forced upon a person. These events may threaten and overwhelm other roles. But not so the identity given persons through the church. It does not change. It remains the same. The Old Testament speaks of the mercy of God which is steadfast and lasts forever. The New Testament tells of an event on a cross which is finished, over, done once and for all. We have been loved by God.

> See what love the Father has given us, that we should be called children of God; and so we are. The reason why the world does not know us is that it did not know him. Beloved, we are God's children now; it does not yet appear what we shall be, but we know that when he appears we shall be like him, for we shall see him as he is. (1 John 3:1-2, RSV)

So the Christian church is the organization *par excellence*. Like all other organizations, it is a group of people deliberately brought together to meet human needs. Like other organizations, it is a channel or means through which persons realize their human natures. Like other organizations, the church provides a medium for persons to find love, work and hope.

But unlike other organizations, in it one does not have to achieve status. One is given a role just by accepting it. Trusting God, having faith in Him, gives persons a part to play that can never be taken away. No threat is great enough to be any danger at all to the truth that persons are children of God.

To be sure, persons can *achieve* love, work and hope by *working* in the church. They can use their gifts in the body of Christ (I Corinthians 12:27-31). They can be witnesses, teachers, officers, givers, servants, activists, missionaries, even preachers. But when the years pass, strength ebbs, motivation falters, accidents happen, and these roles pass away and are but memories, a person's basic status remains the same. Their

status is based on grace (God's love), not on works (the roles they achieved).

Hear these words:

> For by grace you have been saved through faith; and this is not your own doing, it is the gift of God—not because of work, which God prepared beforchand, that we should walk in them (Ephesians 2:8-9, RSV)

So of all the organizations of the world, the Christian church is the organization *par excellence*. It alone offers persons an identity that will never change. The love, the work, and the hope which all persons seek can be found once for all in the church. Their human nature will never be in danger again.

Summary

Let me end where I began: Human nature is social. Persons are what they become in interaction with others. Organizations are those intentional social creations in which persons *find* themselves. Persons seek someone to love, something to do, and something to hope for. This is their nature. This nature comes to life via the roles they play in organizations. These roles can be ascribed (given) or achieved (earned). Roles are always being threatened by developmental (expected) or accidental (unexpected) changes. Time passes. Tragedy occurs. So human nature is always being threatened because roles change.

But not so in the Christian church, that organization which traces its heritage back through the election of the Jewish people, the Garden of Eden, to the creation of Adam. It offers persons the role of "child of God" which can never be taken away, although years pass and accidents occur. It is based on the unchanging love and grace of God.

So the Christian church is the organization *par excellence*. It alone offers persons their nature in a way that assures them they will never have to go seeking it again. By being in the Christian church persons do, in fact, play a role that gives them someone to love, something to do and a future in which to trust.

As one statement about the church suggests, "Dearly beloved, the church is of God and will be preserved to the end of time . . . All, of every age and station, stand in need of the means of grace which it alone supplies."[1] So may it be.

FOOTNOTE

[1]Taken from *The Book of Worship for Church and Home*, The Methodist Publishing House, p. 141.

REFERENCES

Allport, G. W. *Personality: A Psychological Interpretation.* New York: Holt and Co., 1937.

Beckhard, R. *Organization Development: Strategies and Models.* Reading, Massachusetts: Addison-Wesley, 1969.

The Book of Worship for Church and Home. Nashville, Tennessee: United Methodist Publishing House, 1965.

Cooley, C. H. *Human Nature and the Social Order.* New York: Scribners, 1902.

Erikson,E. H. *Childhood and Society.* New York: W. W. Norton and Co., 1950.

Erikson, E. H. *Young Man Luther, a Study in Psychoanalysis and History.* New York: W. W. Norton and Co., 1958.

Etzioni, A. *Modern Organizations.* Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964.

The Holy Bible: Revised Standard Version. Nashville, Tennessee: Thomas Nelson, Inc., 1971.

Lawrence, P. R. and Lorsch, J. W. *Developing Organizations: Diagnosis and Action.* Reading, Massachusetts: Addison-Wesley, 1969.

Le Bon, G. *The Crowd.* London: T. Fisher Unwin, 1896.

Sarbin, T. R. "A Role Theory Perspective for Community Psychology: The Structure of Social Identity." In D. Adelson and B. L. Kalis (Eds.) *Community Psycholoyy and Mental Health: Perspectives and Challenges.* Scranton, Pennsylvania: Chandler Publishing Co., 1970.

Sullivan, H. S. *Conceptions of Modern Psychiatry.* New York: W. W. Norton and Co., 1953.

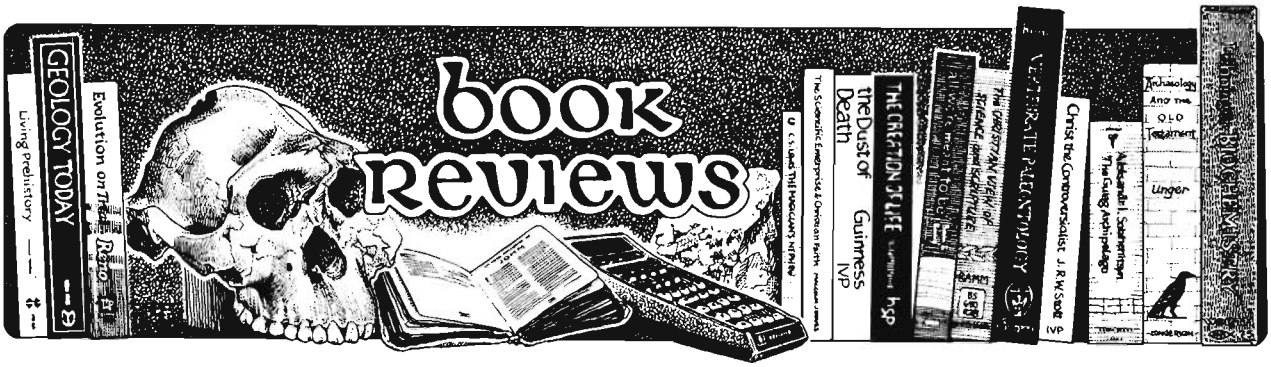
Tillich, P. "You are Accepted." In *The Shaking of the Foundations.* New York: Charles Scribner's Sons, 1948.

Where evangelical affirmations—the triune nature of God, the true humanity and deity of the Christ, his virgin birth, vicarious death, bodily resurrection, glorious ascension, and personal coming, the reality of the Spirit's mission in the church, the need for conversion and new life, the call to discipleship and participation in the tasks of world evangelization and social action—are shared, let these be the ground of unity.

The questions, as I hear them, do not turn on whether the Bible is errant or not. Biblical errancy is not an option for most evangelicals. The questions are: (1) Is inerrancy the best word to use to describe the Bible's infallibility and truthfulness? (2) If inerrancy is to be used, how do we define it in a way that accords with the teachings and the data of Scripture? That is an important agenda, but one far too limited for us to divide over.

David A. Hubbard

"The Current Tensions: Is There A Way Out?" in *Biblical Authority*, J. Rogers, ed., Word Books, Waco, Texas (1977), p. 178.



VALUES AND MORAL DEVELOPMENT, edited by Thomas C. Hennessy. New York; Paulist Press, 1976, 234 pp., $7.95.

This little paperback is a compilation of revised lectures given at the Institute in Moral and Ethical Issues in Education at Fordham University's School of Education during the spring of 1975. Even though the contents are available elsewhere in the behavioral science literature, all but one of the selections were written especially for this book. It has a bibliography (which is not quite inclusive of all authors' citations) but no index. Hennessy has written an introduction to cognitive-developmental theory (Piaget and Kohlberg) but it is so sketchy that the lay reader is not apt to grasp the concepts (e.g., Piaget is summarized in one paragraph) and it is redundant for the informed. However, his preview of the chapters are interesting and accurate, preparing one for what to expect and even building up a few surprises.

Hennessy's purpose is to alert educators to their need for a better understanding of moral development theories and to emphasize the necessity of competent, long-term research before moral education is "tried out" on one's own students. In this sense the book succeeds quite well, mainly because of the format: a paper is presented by a leader in the field, followed by comments of a reactor or two. Issues an author may raise, and even some that he should have but did not, are fortunately drawn and elaborated by the reactors. Herein lies the strength and contribution of the book.

Part One, philosophical bases necessary to understanding moral development, contains only one paper (Clive Beck: "A Philosophical View of Values and Value Education") and three reactions to it. This one paper alone just does not prepare the reader for what follows (Piagetian and Kohlbergian work, for the most part). And nowhere in the book (except by reactors such as Robert Hogan and Wayne Bohannon) is a noncognitive moral development paradigm presented. That is an editor's prerogative and may reflect the nature of most of the research in this field, but it does not air potentially fruitful alternatives in an area so decidedly cognitive.

Part Two (moral development applied to educational and curricular practice) offers interesting, challenging papers by Norman Sprinthall ("A Curriculum for Secondary Schools") and Edmund V. Sullivan ("Values and Issues in Counseling and School Psychology"). Sullivan's paper is particularly critical of school psychologists as unwitting agents of social conformity instead of psychological and educational "advocacy" in service of the student. But he warns that such a psychologist is apt to be at odds with the administration in most school systems.

Part Three is composed of four research papers in moral development and related areas: Harry Kavanagh reports his Ph.D. dissertation (writing about moral dilemmas was more effective than peer-led or counselor-led discussion groups). James Rest describes his empirical "Defining Issues Test" and orientation to moral development as it diverges from Kohlberg's. The reaction by Robert Hogan and Wayne Bohannon captures some of the best critique about cognitive-developmental theory. They are amazed that Rest can still remain in the cognitive-developmental camp because his model, procedures, and findings do not fit that mold.

In another paper Robert Selman describes the educational implications of social perspective-taking as it relates to moral awareness in young children. He characterizes perspective-taking (founded on anecdotal data) but leaves reactor Robert Havinghurst the task of relating social perspectives to moral develoment. Havinghurst also takes the liberty to discuss his own contribution, thereby minimizing critique of Selman's work.

The last article, James Fowler's "Stages in Faith," does not really fit in either moral or value development and appears to be one of those "related areas" mentioned above. From 118 interviews of persons of many

Books Received and Available for Review

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

Barcus, N. B., *Developing a Christian Mind,* IVP, 1977.

Ellison, C. W., *Modifying Man: Implications and Ethics,* University Press of America, 1977.

Evans, C. S., *Preserving the Person: A Look at the Human Sciences,* IVP, 1977.

Miller, W. M., *What is the Bahai Faith?,* Eerdmans, 1977.

Morris, H. M., *The Scientific Case for Creation,* Creation-Life Publishers, 1977.

Parker, G. E., *From Evolution to Creation: A Personal Testimony,* Creation-Life Publishers, 1977.

Ropp, H. L., *The Mormon Papers,* IVP, 1977.

Schwarz, Hans, *Our Cosmic Journey: Christian Anthropology,* Augsburg, 1977.

Smith, N. A., *Winter Past: A Young Woman's Search for Emotional Health,* IVP, 1977.

Wonderly, Dan, *God's Time-Records in Ancient Sediments,* Crystal Press, 1977.

ages Fowler develops an elaborate six-stage theory of faith development and describes and integrates five variables that help "precipitate" these stages. It is all seductively appealing and a fine example of how to develop a theory far beyond what the data merit. His astute, critical reactor, Alfred McBride, acknowledges his daring but devastates Fowler on a number of grounds. He summarizes the theory as

> an (in)adequate product of developmental psychology . . . a well-informed hunch, articulated into a broad series of unproven assumptions, a veritable library of a priori's that have not been deeply tested in any usual sense of that word. (p. 214).

Why is this issue raised?

> I (McBride) feel the need to register this complaint loudly at least for the sake of some of my fellow religious educators who may unwittingly buy this study as a verified developmental package, when in fact it is not. (p. 214)

That sentence could apply, in perhaps a more moderate form, to all educational programs designed to enhance moral development. What is not at all clear, and some reactors raise this issue, is whether the development of moral or value judgments or faith is fostered by these programs and not something else (like the ability to clarify and classify one's own thinking on complex moral issues and communicate more effectively about them).

One last issue that should be discussed concerns reservations about cognitive-developmental theory. That issue can be stated in a number of ways: the adequacy of stages, the gap between scores on a moral development interview or test versus real-world behavior, just to cite a few. On the former issue, Martin Hoffman's extensive review of the moral development literature a few years ago found little conclusive evidence supporting stage conceptions.

One is impressed in this field, and the text reflects it, by the fragmentation of human development into stages of all sorts—intellectual development, moral development, social perspective-taking, faith development —each with its own progression, hierarchy, universality, and of course, qualifications about age variability and so on. Fowler's article is replete with these, and one is hard pressed to understand why he just did not interpret his findings from a social learning or some other continuity position. It would be so much simpler, so much more parsimonious. Might not the proliferation of stage theories fragment human development and destroy human uniqueness as much as the more behavioral positions seem to do?

About the relationship between moral judgment and actual behavior, very little is known. Evidence can be found in either direction. Hogan and Bohannon succinctly capture this problem as it applies to Kohlbergian theory. ". . . will people with Stage Five or Six scores act differently in real-world, moral-choice situations than people with 'lower' scores? On this question the jury is still out, and after 17 years of research." (p. 121)

Does Hennessy achieve his purpose with this book? I think so if it is read by people interested in education with "something more" than the usual academic fare. But it is well to remember that "the jury is still out" on most of the issues. The interested reader can find more on this topic in DePalma and Foley's *Moral Development* and Graham's *Moral Learning and Development.* Thomas Lickona's *Moral Development and Behavior: Theory, Research and Social Issues* is still the best source in this area because of the quality of the papers, the extensive research reviewed, and the scope of its coverage.

Reviewed by David Kapusinski, Assistant Professor of Psychology, Bluffton College, Bluffton, Ohio.

SIMPLY SANE: STOP FIXING YOURSELF AND START REALLY LIVING by Gerald G. May, New York: Paulist Press, 1977, 130 pp., $7.95.

Dr. Gerald May, younger brother of Rollo May, feels we work too hard in life. To relax and accept ourselves; to simply be—this is the secret of effective living. "True growth is a process which one allows to happen rather than causes to happen" (pp. 70-71). May has evolved from a Freudian psychoanalyst into an eclectic, then to "sort of an existentialist" and, more recently, a transpersonalist. Still finding himself in transition, he muses: "One sometimes wonders how many identities will have to die" (p. 68).

His ideas reflect an ambivalence towards both psychotherapy and religion. He sees both as interfering, many times, with our quest for wholeness. However, he acknowledges that both are necessary because we wage a continuing battle for control and self-assertion, a battle we cannot win by ourselves. Without particularly depending upon either psychotherapy or religion, we must learn how to deal with feelings like loss of control, disappointment, mediocrity, vulnerability and aloneness. A distinctive tendency is wanting to "fix" an imperfection as soon as we discover it. (Psychotherapists and religionists are inveterate fixers, he observes.) Instead, we should "be aware of the way things are, the good and the bad, and allow that awareness to move through us toward healing" (p. 123).

In a chapter entitled, "Gentle Meddling", May advises and exhorts us. Much, though not all, sounds humanistic: Be yourself, completely. Don't worry about who you are. "Let it all exist, as awful and wonderful as it may seem. . . . Search . . . for anything that is tight and allow it to loosen" (p. 106). Relax; trust the organism; be open; enjoy the simple things; take things less seriously; accept life, for things are there whether we accept them or not (p. 109).

Giving over the controls of our lives requires a submission, in effect, a verbalizing of Jesus' words: "Thy will be done". We work in vain, he insists, to achieve self-control or mastery over ourselves. The matter boils down to being able to lose ourselves, to give up. After surrendering, full appreciation of our being is necessary. Unfortunately, we have been taught to repress or distort our self-expression as much as our sexuality and aggression.

May shares a number of worthwhile suggestions as to how we can more creatively actualize life, love, acceptance, work, suffering and responsibility. In essence, we must rest in the midst of these, creatively and unselfishly. Our sanity depends upon our ability to accept anxiety and chaos from a "hiding place" from which we can view our problems without alarm.

May's style is informal, rather repetitious and even somewhat rambling at times. The fragmented sentences may prove distracting at first. Once accustomed to

these peculiarities, however, we should be able to respond to his openness and genuine concern for our well-being, and be receptive to the many worthwhile concepts included in the book.

Reviewed by Harold W. Darling, Department of Psychology, Spring Arbor College, Spring Arbor, Michigan.

PASTORAL COUNSELLING: REFLECTIONS AND CONCERNS, by Samuel M. Natale, New York, Paulist Press, 1977, 117pp., paper, $3.95

Who is the pastoral counselor? What is *pastoral* in pastoral counseling? How does he/she integrate the secular and spiritual? What is the similarity or difference between secular and pastoral counselor? These are the critical issues posed by Natale, a clinical psychologist and Jesuit-in-training.

The issues are germane. According to a 1972 survey, 62.9% of pastoral counselors seldom or never resorted to theological or ethical sources, while 66% of their cases had no distinctly religious dimensions. A large number of pastoral counselors have been thoroughly secularized. As one former pastor, now private therapist, said to me: "I keep the religious label for income tax purposes!"

A counter movement of "religiosity" counseling has emerged, which propounds a straight out style of counseling by ministers based on "biblical principles." This movement eschews integration, is often hostile to secular psychological concepts, and is to my mind a regressive anti-intellectualism.

On the other hand, the liberal movement toward integration is no less satisfactory, for it is intellectual syncretism. Thus the author approvingly quotes T. C. Oden in concluding that there is no secular psychotherapy, "when we understand that all being and effort exist in covenant and thus in definite relationship with God." Thus pastoral counseling can be apparently non-committal, for Natale concludes it is effective, "without ever mentioning Christianity at all."

Natale takes on the critical issues only briefly early in the book, seeming to ignore the theological and psychological scholarship that has been done, for his brief references are quite unrepresentative.

The remainder of the book is a valiant effort to describe practical guidelines for parish counseling. But Natale keeps getting caught trying to apply secular clinical modes of private practice psychotherapy to pastoral parish ministry. Natale confuses the role of the clinical therapist with that of the counseling pastor.

The book is an honest struggle with the central problem of the pastoral counselling movement which has tended to convert the pastor into a clinician. Natale tries to return the pastor to his parish, but doesn't quite get there.

Reviewed by E. Mansell Pattison, Department of Psychiatry and Human Behavior, University of California, Irvine, California.

DIALOGUE WITH DEATH by Abraham Schmitt, Word Books, Waco, Texas (1976), 132 pp., $5.95.

". . . He makes you see beauty everywhere. I have never experienced anyone so close to death who came back so alive." These are some of the thoughts expressed by a young mother about her brother-in-law who had recently had a long confrontation with the imminent possibility of his own death. They reflect a dimension of impending death that is either overlooked or ignored today, a dimension of human growth and challenge, a dimension of hope and of promise.

Widely known as a teacher and lecturer on the subject of death and grief, Dr. Schmitt offers a look at death that is both supportive and realistic. He goes beyond the "stages of death;" he bypasses the abstract and focuses on people who have confronted death directly. For several years Dr. Schmitt taught a course on death and dying at the University of Pennsylvania. Included in the program were guest speakers who were often terminal patients with only a few weeks or months to live. Dr. Schmitt shared his experiences as a counselor and the students kept journals in which they recorded their own thoughts and reactions. Out of this series came *Dialogue With Death,* a unique book that shares personal thoughts and misgivings and challenges us to take a new look at the terminal event in our physical life.

In the hospital where I work, death is an everyday occurrence, but is mentioned only briefly, often in a somewhat embarrassed tone of voice; we are supposed to heal, to maintain life, and death somehow represents a failure. *Dialogue With Death* opens a door to an altogether different look at death, one in which death can be a strengthening, a confirmation of life, an experience that intensifies living.

Individuals who are quoted in the book range from young college students with no immediate experience of death to persons with terminal illnesses who are willing to share their thoughts and uncertainties with others. To be challenged for the first time to think deeply about your own death is a sobering experience; many of the journal entries detail the inner wrestling and soul-searching that goes on when a person realizes that death will someday happen to him. Conversely, we see clearly the peace and assurance felt by those close to death who have accepted the reality of the situation and can actually strengthen those who will remain behind after the death occurs.

Central to any consideration of death from the Christian point of view is the question "What comes after death?" Schmitt did not try to secularize his course to make it more "scientific", but gave careful consideration in both his presentations and in the sharing of guest speakers of the Christian outlook and of the hope that can sustain us. In a warm, personal way the sharing of faith and the strength gained from that faith is communicated by many participants who realize their days on earth are short and who look forward to life forever with their Lord.

Dialogue With Death is not a technical book, nor is it a theoretical book; it is an experience, one that can open new dimensions for each of us and enrich our lives.

Reviewed by Donald F. Calbreath, Director of Clinical Chemistry, Durham County General Hospital, Durham, North Carolina 27704.

CREATION VS. EVOLUTION HANDBOOK, by Thomas F. Heinze, Grand Rapids, Michigan: Baker Book House, 2nd ed., 1976, 114 pp., $1.25.

The title of this book is a good guide to the contents. It attempts to provide a defence of Creation against Evolution. It is directed towards young people and others with little or no scientific knowledge. Since the book is written at an elementary level and lacks technical details, it would be quite useful to high school students, but rather redundant for those already familiar with the issues. Heinze has attempted to show the weaknesses of evolutionary theory and provide evidence for creation. The overall argument of the book is as follows: a) there are only two possibilities for man's origin, atheistic evolution or creation (by which the author means *fiat* creation), b) there are many weaknesses in the theory of evolution and much data which it does not adequately explain, therefore, c) creation is the only reasonable alternative.

The argument is fallacious, since one can conceive of any number of hypotheses regarding man's origin, i.e. we have no assurance that there are two and only two possible means of man's origin. Theistic evolution (God's creating of the world and man through a gradual evolutionary process) is an obvious alternative that Heinze does not seriously consider. Unfortunately, Heinze has fallen into the same trap as many other commentators on this subject in assuming that if one throws doubt on evolution, one is thereby validating creation. No amount of evidence against evolution proves creation. If evolution is disproved, it simply leaves creation, as Heinze understands it, as one of many possible theories of origins.

However, if one looks only at Heinze's critique of evolution, which takes up about 90% of the book, his presentation could be quite helpful to many readers. He presents the evidence and outlines the arguments which are inconsistent with, or cast doubt on evolutionary theory. His critique is brief, precise, and easily understood, and should be of considerable value to the student who has received a one-sided account of evolution.

This book needs to be read with caution. As a non-technical critique of evolution, it is good; however, as a defence of creation, it is inadequate.

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

ISSUES OF LIFE AND DEATH by Norman Anderson, InterVarsity Press, Downers Grove, Illinois (1977), Paperback, 130 pp. $2.95.

The author of this survey of issues involved in the sanctity of human life, genetic engineering, artificial insemination, birth control, sterilization, abortion, prolongation of life, transplant surgery, euthanasia, suicide, capital punishment, violence, revolution and war, is none other than Sir J. Norman D. Anderson, recently retired as Professor of Oriental Laws and Director of the Institute of Advanced Legal Studies at the University of London, who is previously the author of such IVP books as *Christianity: The Witness of History, Christianity and Comparative Religion,* and *Morality, Law and Grace.*

The subject matter of this book is, as the author freely admits, somewhat beyond the area of his technical expertise, although his experience with the law makes him particularly sensitive to certain issues that a scientist might not be aware of. It is based on five lectures given as the London Lectures in Contemporary Christianity in 1975. Sir Norman's approach might be caricatured as "extremely moderate." Although this might be taken to be a pejorative assessment, its positive aspects far outweigh the negative aspects that might be associated with the absence of new ground or creative approach. Indeed, the good sense that Sir Norman exhibits can be used as a guide to all those who might be tempted to take extreme positions on any of these issues.

Sir Norman does not avoid problem areas. He even adds an addendum to the discussion of the sanctity of human life on the condition of the dead between death and the day of resurrection. In typical fashion he sets forth four different views frequently held by respected Christians, and then quietly indicates his own non-dogmatic inclination to the fourth of these, namely that our death takes us from space-time into eternity in such a way that to speak of "time" between death and resurrection may be meaningless.

The book would serve excellently as a text to be used in conjunction with a discussion course or seminar on these topics for non-specialists.

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

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William D. Sisterson, Executive Secretary

The Loneliness Factor

The Loneliness Factor is a 28 minute Planetarium Sky Drama developed by the Hansen Planetarium, Salt Lake City, Utah and produced under a grant from the American Chemical Society and W.R. Grace and Co.

The American Chemical Society in celebrating its first century of existence has developed a number of projects which highlight specific challenges to chemical science. *The Loneliness Factor* features some of the ways that the emerging field of cosmic chemistry can deal with such questions as the origin of life on earth, the presence of other intelligent beings in the universe, and means of communication with this extra-terrestial life. This show is being distributed to more than 500 planetariums around the world and will be seen by more people than have ever viewed a specific planetarium presentation.

The show has the usual visual and aural delights found in presentations of this type. The lightning and thunder, the motion of the stars and tracing of cosmic events on ceiling and walls with a background of appropriate music and authoritative sounding voice overlay are a delight to the eye and ear.

The film begins with a retelling of "how" life began on Earth. It postulates that in the death of super giant stars 15 billion years ago were born the elements of life that are scattered in space. As our planet cooled an environment favorable for the production of the molecules of life became possible and in time life emerged in a pattern suggested by the Oparin-Haldane scenario.

If life arose spontaneously on Earth, could it not have developed on any planet that had an environmental history similar to Earth? There are an estimated 200 billion stars in our Galaxy and perhaps 100 billion galaxies in the universe. It is not unreasonable to suggest that with all these possibilities a million planets exist where life could arise. Man is not alone. How then can we communicate with extraterrestial man? Space probes are too slow. Radio signals provide one means. Today our neighbors in near-by stars are receiving bits of "The Lone Ranger" and "Jack Benny" broadcasts from a quarter century ago. Can they understand these signals? Can we understand their signals as we point the radio telescope to outerspace? Some interesting speculations on the physical characteristics of space-man as a function of different environments (gravity, gas composition, etc.) drew the only laughs of the presentation.

The program concludes "that humanity stands now on the shoreline of a sea of unthinkable infinitude, awaiting that first message from the stars." "This communication will mean, in a sense, that the forever journey is beginning, that man can go home to the stars from which he came—lonely no more."

The film is aimed at a popular audience—many times children. As such it cannot be expected to contain scientific detail or indicate more than one approach to a particular issue. A clear and direct message is portrayed. Unfortunately, the line between speculation and certainty especially in recounting Earth history is ignored. The booming voice comes across saying how it was—not how it might have been.

There is no sign in the show of meaning or purpose in any of the cosmic events portrayed. The fourth dimension of Will Durant is missing. One cannot expect a sectarian view in such a presentation, yet to avoid any reference to this area seriously limits the overall usefulness of the film. For the Christian the scientific aspect of nature must be viewed with an eye of faith. Take a Sunday School class of kids or adults to see this show. It is a great way to begin a discussion of origins.

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A Communique from Outer Space

The communication below was received one night in March. I personally am not one who readily believes in flying saucers and little green men. But I like to think I have an open mind on the subject of extraterrestrial life. I ask the same from the readers of this communique for it has something important to say to the theological community.

Dear Friends:

Even though we are separated by a million light years, I feel we can address you as friends, because we are all creatures of the almighty Creator of the Universe. What we are about to say to you should not be misunderstood as interference in your internal affairs. It is rather a challenge to all Christians who profess to be modern in their religious thinking, but who in reality have not extended their faith beyond their own solar system.

We have watched as you have made your first attempts to probe outer space. A startled cry went up when the first satellite was sent skyward. When the first "giant step for mankind" was taken, there was much ado about bringing theology into the space age. More recently your scientists huddled about their monitors as Viking I gave man his first opportunity to explore the existence of life on another heavenly body. But it seems to us who speak to you from the great beyond that the religious thinkers of your age are steadfastly rooted to the planet earth as if it were the only object worthy of God's concern. Let us assure you that earth has been greatly blessed, but it does not stand alone in the eyes of the magnificent God-Being who created us all.

We are at times puzzled at your resistance to the idea that intelligent life surrounds you as the stars encircle your own earth. The statistics in favor of extraterrestrial life do little to persuade you that the process of hominization is common place. With each passing year your astronomers come closer to realizing how vast the universe is. I believe the most remote body discovered to date is quasar OQ 172 which is estimated to be ten billion light years away. That is not bad for a start, but it is only a start! In 1953 Teilhard de Chardin calculated there might be a million planets capable of supporting life, but his calculations were based on the ridiculous projection that at least one planet in each galaxy would have the proper conditions. I say ridiculous because even the existence of a billion galaxies would be a conservative reckoning.

We have to assume that Christian theology suffers from certain inherent restraints that have not properly been dealt with. I mention only a few in the hope that in the coming decades theology might experience a similar radical reorientation as it did when the populus realized the sun rather than the earth was the center of your minuscule world.

(1) The creation, Genesis 1:1ff. We do not presume to imply your Holy Book is in error about the creation. We sense that it is your own provincial attitudes that persuade you to interpret Genesis 1:1 to mean: "In the beginning when God first began to create, he created your world in the midst of total chaos and darkness." How quaint of you to believe God made earth first and that, theologically speaking, the universe turns around the wonders he wrought in your solar system. Do you not at times grow weary of reading Barth, Bonhoeffer, Tillich, Pannenberg, and others who focus your thoughts on straight line extrapolations from the present to the future without opening the way to realms and tomorrows beyond your comprehension?

(2) Concerning another matter we are aware that earthlings still have difficulty assimilating the scope of evolution. We must laud your science fiction writers, because they seem to be the only ones who see evolution for the truly grand plan that it is. It seems to be assumed by the majority of thinkers that creative evolution has its beginning and end with the planet earth. The obstacle we perceive is the implied doctrine that mankind was, and is, the pinnacle of God's creativity. Isn't that just a little egotistical? You might become acquainted with Arthur Clarke's *Childhood's End* (1953) or Clifford Simak's *A Choice of Gods* (1972). It does not matter

that they speak of an impersonal "Overmind" or "the Principle." What matters is that the world does not end with total destruction or utopia, but the transfiguration of the human race into a higher yet unknown form of spiritual life. Perhaps your billion years of evolution is only a preparatory step toward the integral evolution of the universe?

(3) Is it narrow-mindedness or a notion of orthodoxy that limits your kind from envisioning a radically different concept of God? Christianity describes God in such marvelous terms: infinite, omniscient, omnipotent, omnipresent. More recently you seem to prefer terms such as "ground of Being," "God forward," "upward pressure," which are more freeing, but even they fail to realize what those adjectives mean in an universe where your solar system is like a single amoeba swimming in the waters of the earth's oceans. But how can we expect you to know anything about the sovereignty of God, when you know nothing of the extent of time and space, not to mention other dimensions.

(4) According to the biblical theology of your first and second millennia, only earth has known original sin and stands in need of redemption. The incarnation of God in Jesus Christ is therefore the singular, unique, once-for-all, final revelation of the Creator. Yet, we must remind you that this doctrine was formulated during a time when the earth was considered to be the center of the universe, and the universe extended no further than the naked eye could see. If, on the other hand, there exists a multitude of thinking stars, no matter how advanced or primitive, would they lie outside of God's redemptive love?

I suppose it could be imagined that Christ's work of divinization was meant to spread over the universe and that plans should commence to establish a space ship evangelism. But should it not be considered highly likely that just as God so loved the planet earth that he sent his beloved son, he also loved the other worlds that he created that he gave up his son to them? It is obvious that your whole Christian tradition presents a very terrestrial Savior whose redemptive power does not extend beyond individual salvation. We find such a tradition impoverished, especially in light of your own biblical insights into the Christ who is not bound by the totality of space and time.

(5) We can understand how the sheer immensity of the universe plays havoc with any philosophy-theology that attempts to construct a coherent, logical scheme. We suspect that only God himself can comprehend and make sense of the immensity. Perhaps with this in mind you will allow us to mention one more obstacle that is keeping you earth bound.

The classical linear view of the universe may at first seem very satisfactory, because it presupposes a definite beginning and end. Time is boxed in, so to speak, by the creation and the eschaton. But time extends beyond the interval of Genesis to Revelation. Your scientists will continue to debate the concept of "steady state," which theorizes that matter is being continuously created, and a theory of entropy whereby matter does not endure forever; but sooner or later your best minds must contend with the idea of a universe that is infinitely expanding or open ended. In periods of billions of years the universe oscillates between contracting (cooling) and expanding (heating). Undoubtedly some theologians will argue that there is no place for God in an infinite universe, for only God is infinite, but their conception of God is too small. Rather, it is only in such a limitless universe that an infinite God is comprehensible.

It is time for this communique to come to an end. It was brief because we did not intend to offer solutions but to press your theological thinking so it might grow. We addressed you as "friend" because we are your friends, but you will most likely think of us as "aliens." It is not so much the million light years that separate us that makes us seem alien, as it is your failure to look for traces of the Almighty's creativity in the starry beyond and the Planck distance.* Put aside your geo-centricism and your insular hubris and you will see the breadth and depth of the Creator's love.

*A Planck distance is a hundred billion, billion times smaller than the width of an electron.

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Biblical Perspective on Engineering Man-Machine Systems

Introduction

A man-machine system is the combination of people and machines working together to accomplish some purpose. Some common examples are the family car and its driver, and an airplane and its pilot. An assembly line is also a complex of man-machine systems. Developing such systems is the trade of engineers. The Christian engineer is in a special position to see the rebellion of the world against God, and seeing the evil, he is responsible before his Lord for his witness to the truth and his testimony to the redeeming power of God. The purpose of this Communication is to illustrate how biblical principles apply to the engineering practice of the Christian.

The Rebellion of the World

> Let us build us a city, and a tower, whose top may reach unto heaven; and let us make us a name, lest we be scattered abroad upon the face of the whole earth. (Genesis 11:4)

A man-machine system reflects the spiritual condition of its builders. It may reflect submission to the Lord, or rebellion.

In Genesis 11, we find the story of a major technological project, the Tower of Babel. The people decided to build a city and a high tower to become famous. When the Lord saw their rebellious attitude, He confounded their language, and the people were scattered. The phrase "reach unto heaven" suggests that the purpose of this project was to make man equal with God. This desire to be self-sufficient, independent of God, is one of the prime expressions of man's sinful nature.

This purpose is also typical of modern man-machine systems. The stated purpose of a computer system is usually "to extend man's abilities." This reflects the deeper purpose of the heart: to be equal with God, "to reach to heaven." A computer data bank is an attempt at "omniscience"; teleprocessing and remote sensing suggest "omnipresence"; computer control of huge machines suggests "omnipotence." Computer systems are often vehicles for man's attempt at technological self-sufficiency. The building materials of the Tower of Babel illustrate striving for self-sufficiency: man-made brick rather than natural materials such as wood or stone. Similarly, computer programs are the epitome of a man-made building material: they are simply ideas. Man keeps trying "to reach to heaven" by his own efforts.

There is also an analogy between Babel and our computerized society in the Lord's judgment against them. The judgment against Babel was confusion; today, much of the complexity and confusion of society has been made possible only by the computer. "To err is human, but it takes a computer to really foul things up."

The similarity between the Tower of Babel and modern computer systems has little to do with the technologies; it lies in the similarity of the heart conditions of their respective builders. The world is still rebelling against the lordship of the Creator, and is using technology to express that rebellion.

In contrast, the engineering practice of the Christian is submitted to the lordship of Christ. In Ephesians 5:8-13 Paul emphasizes that we are to "walk in the light." The grace of God working in the life of the Christian produces goodness, righteousness, and truth, and thus, by contrast, his life will make the rebellion of the world plainly evident. The Christian engineer is to let His light shine.

> For ye were sometime darkness, but now are ye light in the Lord: walk as children of light; (For the fruit of the Spirit is in all goodness and righteousness and truth;) Proving what is acceptable unto the Lord. (Ephesians 5:8-10)

The Responsibility of the Engineer

> And when the people saw that Moses delayed to come down out of the mount, the people gathered themselves together unto Aaron, and said unto him, Up, make us gods, which shall go before us; for as for this Moses, the man that brought us up out of the land of Egypt, we wot not what is become of him. (Exodus 32:1)

In Exodus 32 we find the story of the Golden Calf where the children of Israel asked Aaron to make them gods which would lead them out of the wilderness. Aaron took the people's gold and

made a Calf. Aaron then led the people in worship of the idol. Moses came down the mountain and found the people dancing before the Calf, and was very angry. When Moses confronted Aaron with his sin, Aaron tried to pass the blame on to the people and tried to minimize his involvement in building the Calf: "then I cast it into the fire, and there came out this calf" (v. 24). Aaron made it sound as if the Calf came out spontaneously. Moses also confronted the people with "Who is on the Lord's side?" and three thousand men died in the ensuing judgment. Finally, Moses interceded for the people before the Lord. The key spiritual truth of his encounter with the Lord is that each person bears the responsibility for his own sin. The people sinned in asking for other gods, and Aaron sinned in making the idol and leading the worship.

This story is comparable to engineering a man-machine system. The people had the role of project sponsor, and Aaron had the role of engineer. His solution to their demands was to build the Golden Calf, but he failed to meet their need, because the Calf was incapable of leading them out of the wilderness. He catered to the rebellious purpose of the people, rather than pointing them to the living God. Aaron's problem is similar to that of the Christian engineer. The world demands a technological savior, but only the living God can solve the world's problems. The real problem is sin. The Christian engineer is often tempted to let the worldly sponsor assume that a man-machine system is a technological savior. It may solve a technical problem, but in reality, no technical system can solve the real problem, sin. Only the grace of God can do that.

The analogy between Aaron and the Christian engineer goes further. After getting caught in a counter-productive project, the Christian engineer is tempted to pass the blame to the boss ("he was in charge"), to the sponsor ("he asked for it"), or to chance ("oops . . ."). However, the spiritual truth still applies: each person is responsible for his own sin.

Even though the Christian engineer faces these temptations, he has the power of Jesus to be victorious over sin. It is the blood of Jesus which completely cleanses him when he falls, and it is the power of the Holy Spirit in his life that makes victory over temptation of a practical reality. Romans 8:11-14 draws the distinction between living after the flesh (our own power) and living by the Spirit (His power). The key principle for the Christian engineer in dealing with the world's demands for a technological savior is to be led by the Spirit.

> For as many as are led by the Spirit of God, they are the sons of God. (Romans 8:14)

The Lordship Of Jesus

> For by him (Jesus) were all things created, that are in heaven, and that are in earth, visible, and invisible, whether they be thrones, or dominions, or principalities, or powers: all things were created by him, and for him. (Colossians 1:16)

In the realm of technology, the inventor and the entrepreneur are the image of success. It is always assumed that man is the creator of man-machine systems: the designer invents ideas; the entrepreneur makes things happen. Thus, man takes all the credit for himself.

In Colossians 1:16-22 we find that Jesus is the creator of all, even the technology of modern society. The Christian engineer knows that it is only by the grace of God that men design and build anything, and as head of the church, Jesus is to be glorified in all things, in particular his own work.

In the realm of technology, the two roles of Jesus as Creator and Redeemer complement each other, because every created thing is fulfilled in Him and is reconciled with Him through the cross. God's purpose in creating man-machine systems has been that Jesus be glorified. However, sin has caused alienation between God and creation, so we see many systems that are destructive and oppressive. It is the blood of Jesus that redeems fallen man-machine systems. A man-machine system is redeemed through God's redemption of the engineer who builds it and the people who use it. A system engineered to the glory of God is motivated by a righteous purpose; it is designed around the needs of people; and it is implemented with the highest standards of craftsmanship. A system used to the glory of God is truly beneficial to people and is not oppressive or destructive.

> And, having made peace through the blood of his cross, by him to reconcile all things unto himself; by him, I say, whether they be things in earth, or things in heaven. (Colossians 1:20).

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(Paper presented at 1976 Annual Meeting of the ASA.)

Of Men and Computers

Since my earliest childhood I have had exposure, drilling, teaching, and indoctrination in arithmetic. Curiously, I've never had anyone suggest to me that I believe in arithmetic as an adult because I had arithmetic drilled into me as a child. The implication would be, of course, that had I been reared in an amathematical house I would recognize arithmetic for what it is: a piece of folklore which some parents and groups cram down their childrens throats.

To say that a body of knowledge is folklore and that small children are indoctrinated with it, leaves open the questions of its validity, authenticity, dependability, truthfulness, etc.

Let us suppose now that I say to you, "You believe in arithmetic because it was ingrained so deeply as a child." I would probably mean at least two things: (1) arithmetic is a bunch of baloney; and (2) your commitment to arithmetic (in the sense that you rely upon it) results from preconditioning rather than from your making a responsible choice. We expect people to be able to determine the true nature of things and to make responsible choices.

For the sake of brevity, let me call the "true nature of things" the "reality." I will make no attempt to define "true nature of things." Whenever we assert that two plus two equals four, or that the earth is round, we are not merely making a statement about our desires, feelings, or preferences. We sometimes change our minds about things and say we were wrong. The reality is there as a standard against which we measure our perception of the reality. The reality and our perception (what we think the reality to be) are different. The earth didn't change its shape whenever the prevailing view changed. Perception changed; reality didn't. Whether we are right or wrong, whenever we make an assertion about reality we are saying that our perception is an accurate description of reality. We often equate our perception with reality, but to make a statement is one thing; to equate the statement with truth, is another.

We engage in debate with our fellows to attempt to persuade them that our perception is an accurate description of reality. We assume they (as well as we) have the capability of understanding. In many instances we expect more of our fellows than that they understand. We expect them to act on the basis of their understanding, but before long we find that their actions are not what we anticipate. Action of a specific kind results from a responsible choice and is therefore unpredictable.

The first thing that we learn from the Bible about man is that God made man in His image. God then placed man in the garden and told him not to eat of the fruit of the tree of the knowledge of good and evil. But the tree was there; the fruit looked good. A responsible choice was made at least once. (I say at least once because we know only of the time the choice was made to eat the fruit.) Note that I am consistently using the designation *responsible* choice. We can probably safely assume that neither Adam nor Eve flipped a coin each time the tree came in sight; heads I eat; tails I don't. The choice was not random; it was not the result of irresistible instinct; it was a *responsible* choice. There were real alternatives; there were legitimate options. God has made us with the capability to make choices and has placed us within circumstances in which there are open options. One of these options, as we learn from Scripture, is to "fear God and keep His commandments." Even in the most ideal earthly circumstance one who walked daily with God chose not to do that. It wasn't the result of a bad environment during childhood. It was the result of a responsible choice.

God also told those created in His image to "fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth." God calls upon us to know reality; to ascertain the true nature of things.

Man, created in God's image, is able to make statements about reality and to claim that the statements are true. Man is also able to make responsible choices. As a result man has accomplished many

things, some good, some bad; some constructive, some destructive. One of man's accomplishments is the development of computers. The size and complexity of the problems and the speed and accuracy with which they are processed, is truly staggering.

Anyone who has worked with computers knows how uncompromising they are. A recent space mission was delayed because of an extra comma on one of the cards. A computer program (if executed at all) is executed exactly as written and not as intended. Even the most obvious "It's obvious what I meant" is no more useful than is the most ridiculous.

In order to be useful and dependable a computer must be entirely predictable. Any randomness, any spontaneous departure from expectation renders all results useless garbage. We see here an immediate contrast between man and machine. The very quality which makes man Man makes a computer useless. Man has the capability of responsible choice and can decide not to do what he is supposed to do. Any computer is in trouble if it "decides" not to execute a statement which it is supposed to execute.

A computer can generate literally endless reams of paper printouts with a very small input. However there must be a generating algorithm. A computer can't generate without some input which generates the generator. Is it possible to build one which is self generating?

Computer art and computer music are constantly produced. Is it possible to build a computer which can create a piece of literature or a non-randomly generated piece of music?

Computers are supposed to be "learning." Self correcting mechanisms are being developed so that a computer will "learn" that certain moves under certain conditions in chess should not be made. Is it possible to build a computer which can "learn" and still make a bad move just for the fun of it?

Computers can store and retrieve almost endless pieces of information. Is it possible to build a computer which can *know* any of the information? Can it know that it knows? Is it possible to build a computer which can know that it was built by man? Or, if the atheist is right, is it possible for a computer which wasn't made with the idea of someone of a nature different from itself, to think that this someone whose existence it accepted because of a wish fulfillment, did in fact make it?

It is ironic that there is interest in developing computers which can think and reason as people do. The instant a computer acts like a person and, by responsible choice, chooses to do the wrong thing it will be scrapped. Its makers will never know that they have succeeded in making a computer which can act like a person. If at each step of a program there are open options, and the computer makes a responsible choice whether to execute one of them, and if so, how, there will eventually result two different outputs from the same program. The sign will go up over the door to the computer room: "machine is down."

If a computer fails to live up to the purpose for which it was made it is either modified or destroyed by its makers. There is no room for forgiveness and/or redemption.

God made man in His image. Man made computers but not in his image. Computers are either entirely predictable (whenever they function properly) or entirely useless (whenever they function improperly). Man is sometimes predictable and sometimes useful. It is God's image in man which enables him to be ultimately unpredictable (the result of making a responsible choice) yet at the same time to be ultimately useful (the result of choosing to be reconciled to God).

Both man and computers have been made by another. By keeping options open for His creatures, God has enabled them to become something other than what they are.

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(Paper presented at the 1975 Annual Meeting of the ASA in San Diego.)

Evolutionary Thought and the Morals and Dignity of Man: Some Inconsistencies

Absolute truth does not exist for a growing number of people in the world today. The laws of religion are no longer binding for a majority of the world's inhabitants. Even science, the accepted heralder of "truth," can offer only a close approximation to this elusive entity — and a strong probability may be replaced by a stronger one at any given moment. This relativity is pervasive in all areas of modern life.

While scoffing at the idea of an absolute moral law, and proclaiming himself no more than an animal with an extensively convoluted brain, modern scientific man lives as though his life has purpose, and as though he deserves fair treatment from the world around him. Despite the obvious lack of concern on the part of evolution for justice and dignity, man shouts loudly not only that he wants to live as long as possible, but that he wants to live well! He takes every precaution to preserve his own physical body, and to shower it with comfort and luxury. His life is sacred to him, and his right and freedom to live the life he chooses are defended vigorously.

Proponents of an evolutionary world view such as George Gaylord Simpson and Jacques Monod admonish us to break with the irrational past and pay homage to science. Simpson asks us to recognize that Darwinism has been accepted for a century, and then scolds us for continuing to pursue the higher superstition of Christianity.[1] Monod rebukes us for sharing in the benefits of scientific-technological discovery, but not acknowledging that materialistic science is the only god to whom we should give obeisance.[2] It is frightening, to say the least, that these highly influential and educated men advocate breaking with the past in both practice and theory, yet offer no workable alternative system. In fact, the system their theory naturally brings forward is the one we see today: a moral and ethical chaos based purely on the arbitrary desires of any particular society at a given moment. Since there is no absolute, transcendent authority, power rules; though individual man in a position of strength claims to believe in a just world, his just world view most always ends at his own doorstep. In this kind of a society, it is predictable that Hitlers and Mansons will arise, perpetrating justice in their own narrow definitions of the concept.

In a recent discussion with a scientist friend, the issue of absolute versus relative morality came up. His opinion was that relativity is a fact of life, and nothing to be opposed. One obviously is not physically capable of the same concern for starving people in India as one has for the well being of one's own child; promiscuity (homo or heterosexual) is not a matter of concern in far off Congress, or on Bughouse Square in Chicago, but only if it invades your immediate neighborhood or your child's school playground. In his opinion, morals are obviously "adjustable," depending on the personal will and pleasure of the individual.

What is the real reason for this obviously contradictory standard for you (and those close to you) and for "others" afar off? This communication reviews two examples of outstanding inconsistencies in the thought and practice of naturalistic man, and then discusses them in light of what the Bible says about the nature of man's heart.

Animal Experimentation

That man has finally been forced to take his place with the animals is a well made point in present day college psychology courses. It is stressed that egocentric, pre-evolutionary, Christian man assumed himself a specialty, indeed, the focal point of God's creation. College professors proudly proclaim their humility in assuming a place amongst, as opposed to above, the rest of the animal kingdom.

In spite of this avowed willingness to share fully in his animal ancestry, *homo sapiens* has not yet offered himself for scientific experimentation. To be sure, a few dedicated scientists have been their own experimental subjects, and some have died as a result. It is also true that Hitler did experiments with humans during World War II, but the rest of the world decried the fact that masses of "human animals" were sacrificed. In this present day, such ne'er-do-wells as the retarded and prisoners are often made available for experimentation, but strict rules govern the lengths to which the investigator may go. He is expected to uphold a well defined moral and ethical code in his work with human subjects.

If man is just one of the animals, as many would have us believe, why such sorrow when a dedicated scientist is lost to the world; why ethical and moral guidelines for research which involves human subjects? The less privileged animals (whom we supposedly have joined in rank) have guidelines to guard them against atrocities, but nevertheless they suffer immensely. They are bled, poked, given tumors; they are bred to die! Does evolutionary man really comprehend the implications of his suggestion that we are simply animals, with no spirit or personality which makes us stand out? Clearly he does not! In spite of concentrated, and many times exaggerated, attempts to erase the spirit and dignity, man (including the most avid materialist), lives a life which loudly broadcasts his spirituality. This manifestation is more often than not a severe distortion of the spirit which God desires, but it is there, nevertheless.

Sexual Morality

For secular man, murder is wrong but adultery, homosexuality etc., are only relatively wrong. The idea today is that "as long as nobody gets hurt, anything goes." Ours is a society of convenience, we do what is easy, what is fun, and what feels good at the moment, with little, if any, thought about possible consequences. Though it is obvious that rampant veneral disease, abortion, unwanted children, and divorce are often results of sexual misuse, costing the society a monumental amount of worry and money, modern man prefers to think of himself as a liberal, and declares sex a matter of preference, not morality.

A newspaper on my desk at work recently sparked an interesting comment along this line. As the director of our research division passed my desk, his eye caught the by-line of an article appearing in the religious news section, which went something like this - "Priest says the Bible does not Condemn Homosexuality." His comment was quick and to the point, "Who the hell cares what the Bible says about homosexuality!" The same man came back from a scientific meeting in New Orleans a few weeks later, and exclaimed that a previously beautiful section of New Orleans had turned into a homosexual greeting ground with young boys selling their bodies on every street corner. On the one hand, this man refuses to acknowledge an absolute morality which condemns homosexuality; yet on the other, he is repulsed by the presence of promiscuous homosexual practitioners, and states that their presence in a formerly attractive area has caused severe degeneration of that area. Once again, there is glaring inconsistency in the thought and practice of secular man.

Inconsistency Explained

Psychology and sociology seek to explain consistent and inconsistent behavior in Godless terms. The way man thinks and behaves is determined solely by his genes, his evolution, his environment, or his society etc. Sociobiologist E.O. Wilson, according to a recent *Time* article, tells us that there may be genes for homosexuality, spite and conformism.[3] B.F. Skinner suggests that we must rid our minds of the idea that man is dignified and free. Only as we accept our evolutionary, spiritless, biological selves will we come to know and understand the real causes of behavior.[4]

In 1973, a book came out by Karl Menninger titled *Whatever Became of Sin?* As Christians, our answer is that it is still around and has become nothing different from what it has always been. It is, and always will be, disobedience to the commands of God as proclaimed in Scripture. Unregenerate man despises the thought of having to worship and to pay homage to the God of the Bible. Romans 1 says that man has a knowledge of God and the truth, but that he suppresses that knowledge because of his sin. This explains the inconsistency in the thought and practice of the Godless individual. C.S. Lewis says it beautifully in *Mere Christianity:*

> "If the universe is not governed by an absolute goodness, then all our efforts are in the long run hopeless. But if it is, then we are making ourselves enemies to that goodness every day, and are not in the least likely to do any better tomorrow, and so our case is hopeless again. We cannot do without it, and we cannot do with it. God is the only comfort, He is also the supreme terror: the thing we need most and the thing we most want to hide from. He is our only possibly ally, and we have made ourselves His enemies. Some people talk as if meeting the gaze of absolute goodness would be fun. They need to think again. They are still only playing with religion. Goodness is either the great safety or the great danger - according to the way you react to it. And we have reacted the wrong way."[5]

Man, therefore, in proclaiming himself an empty organism, just one more result of evolution, yet living with a sense of his own sacredness, is evidence of the Bible's accuracy in diagnosing his condition. Aware of God's higher absolute moral standard, and convinced of his own dignity and spirit as made in the image of God, man continues to blaspheme and desecrate the very name of God for his own ego flattery and convenience. He knows what is right, but does not do it. Romans 1 says that he not only does wrong himself, but condones wrongdoing in others. The apostle Paul appears to be describing those liberal-minded people of our present day who truly are not their brother's keeper.

Christian Inconsistencies

The Bible gives the follower of Christ a consistent living guide. Life is precious; man as made in the image of God should first love God in Christ, then serve and fellowship with his brother, and finally protect and nourish the world and the animals which God has given temporarily into his charge. Unfortunately, Christians often live as inconsistently as does secular man. Our world view tells us that all life is something to be cherished, as a creation of God. Yet we eat too much meat; we allow (by our unconcern) the slaughter of hundreds of thousands of innocent animals in laboratory experiments (not all of these experiments are unnecessary, but many are); we contribute heavily to atmospheric pollution and resource waste. Perhaps a consistency on the part of the Christian community would help to persuade secular men of their wrongdoing.

The Bible also gives us a totally adequate moral guide. We tend, again, as does unregenerate man, to often be inconsistent in our thought and practice. We embrace sexual morality; we are, for the most part, heterosexual and nonadulterous. Our inconsistency shows itself in our readiness to be sexually obedient, but not to be materially destitute. Our sexual behavior shines, but our bank accounts and cupboards are often in a close to immoral condition.

If those in the world are to face the errors in their thinking, it is imperative that we as Christians face up to the inconsistencies in our own lives. We must, with Paul, readily admit that ". . . I do not do the good I want, but the evil I do not want is what I do" (Romans 7:19, RSV). It must be clear to the unsaved world around us that we are only sinners, saved by the grace of God. Even the inconsistencies of the redeemed will not totally disappear in this lifetime, but the Christian, again with Paul, is pressing "toward the goal for the prize of the upward call of God in Christ Jesus" (Phil. 3:14, RSV). The Bible tells us that Christ's strength is made perfect in our weakness. As we allow God's word to penetrate our lives, our inconsistencies are more and more lost in His perfect consistency.

The world today is looking for something - anything which brings security, truth, stability, warmth, love. That secular, materialistic man recognizes and hates his Godless inconsistency is evident in the suicide, divorce, addiction, and mental illness statistics. We as Christians can share with a dying mankind the consistency which is found only when man comes to God through Christ; when he recognizes that he is a spiritual, dignified, moral being, whose only *raison d'etre* is to serve his Creator.

References

[1]Simpson, G.G. *This View of Life,* Harcourt, Brace and World, Inc., pp. 6-7, 1963.

[2]Monod, J., *Chance and Necessity,* Alfred A. Knopf, pp. 170-171, 1971.

[3]Donovan, Hedley, ed. in chief. *Time,* Inc. "Sociobiology: A New Theory of Behavior." Aug. 1, 1977.

[4]Skinner, B.F., *Beyond Freedom and Dignity,* Bantam/Vintage Books, p. 191, 1971.

[5]Lewis, C.S., *Mere Christianity,* The Macmillan Co., p. 38, 1952.

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Can A Christian Be A Behaviorist?

No psychologist, with the possible exception of Freud, has raised more eyebrows, created more astonishment, and instilled more fear into the hearts of Christians than B.F. Skinner. Though not a clinician, Skinner has developed "behavior modification" techniques which have proven highly effective when applied to some of the most recalcitrant psychiatric problems. This has led some to hail the Harvard psychologist as a great humanitarian.

Others, reacting negatively to such publications as *Beyond Freedom and Dignity,*[1] have seen Skinner as a naive utopianist, diabolical materialist, and psychotechnological guru of totalitarianism. Skinner, so the rhetoric runs, wants to dehumanize us by stripping away our most fundamental rights as persons. He wants to control us by placing at the apex of society, not Plato's philosopher-king, but a panel of cold, manipulative, emotionless scientists who would arrange for everyone else, and indeed for themselves, "contingencies." Contingencies specify consequences. "If you do this, such and such will follow."

Behaviorism as a "school" of psychology was launched in the second decade of this century as a reaction against the introspective methods of the structuralists. Structuralists, like Wundt in Germany and Titchener in the United States, were busy trying to discover the basic building blocks of mind. This they attempted to do by training "observers" to examine their own conscious contents, for example to look at a broad array of colors and to decide which ones were primary. Structuralism and its methodologies ran into trouble when it became evident that observers at different universities could not agree on their findings. What were primary colors for one research group turned out to be different from those for another. The contaminating effects of observer bias and expectancy became increasingly more manifest. Structuralism was dealt its death blow at the hands of John B. Watson. Capturing well the spirit of his times, he ridiculed psychologists for asserting what was in the consciousness of another, whether rat or human. Although three other schools of psychology were either flourishing or being born, namely psychoanalysis, functionalism, and Gestalt, behaviorism quickly cornered the academic marketplace and has been the dominant stream of psychology in America ever since.

It is helpful, if not crucial, to make a distinction between methodological and philosophical behaviorism. A *philosophical behaviorist* denies the importance, and sometimes the existence, of mental activity broadly defined. All states of consciousness, thoughts, feelings and attitudes for example, are anathema to the philosophical behaviorist who views them as "epiphenomena." While mental contents may *seem* to be important in the determination of behavior, this is mere illusion. Above all, the philosophical behaviorist is against granting any real status to the contents of mind. To him or her, the arch enemy is "mentalism." John Watson was this sort of behaviorist, and the same has been said of Skinner, though Skinner has taken great pains recently to clarify the exact nature of his position in *About Behaviorism.*[2] Behaviorists such as Watson and Skinner are sometimes called "militant behaviorists," to indicate the vehemence with which they attack mentalistic conceptions.

A *methodological behaviorist* does not deny the existence or the importance of mental contents. On the contrary, thoughts, feelings and attitudes are, if not the stuff of life, at least very important. The methodological behaviorist *does* insist, however, that a science of psychology cannot be based on introspection. Certainly it cannot be founded on listening to someone else's introspection. While such a procedure may yield valuable clinical information (Freud's great contribution and genius was his ability to make good use of such reports) it cannot be used as the basis of a science for at least two reasons: (1) introspections and reports of introspections are rarely systematic enough to meet the canons of science[3] and (2) they are not capable of public verifiability. A science must be based on procedures sufficiently rigorous so that the same experiment may be conducted by someone else half way around the world and yield the same results.[4] Admittedly findings in behaviorial science are rarely this neatly replicable. Methodological behaviorists nevertheless insist that only "objective" data are truly scientific.

The position of the methodological behaviorist is based on the recognition that, while your internal states are primary data for you, they are only secondary data for me, and conversely. Ultimately the only person who has direct access to an individual's mind is him- or herself. Methodological, or scientific, behaviorists assert that science must be grounded in data which are primary to all. Thus, we can admit only that which *both* of us can observe directly. This fairly well rules out aspects of consciousness.

I should note in passing that there are respectable indirect ways of getting at mental operations, procedures to measure what methodological behaviorists call "mediating events." Over the past decade or two, centers for the study of cognition have emerged all over the country without any attending loss in scientific respectability for themselves or the profession at large. The research conducted at most of these centers, however, is very carefully performed. Sophisticated mathematical analyses are often used to uncover subtle and complex relationships among variables and subjective reports of mental operations are rarely taken at face value. Instead they are treated as simply one more source of information to be checked and double checked just like any other source. It is common for a methodological behaviorist to treat such self reports as "verbal behavior." Such a designation makes it clear that they provide no "royal road into consciousness" similar to what Freud maintained dreams to be with respect to unconscious processes.

A methodological behaviorist, therefore, has no philosophic axe to grind. He or she has no particular metaphysical or ethical position, at least not as part of his or her science. He may be a good or bad man, a Christian or an atheist, a socialist or a democrat, it makes little difference. As a *scientist,* all that matters is that he be rigorous, which partly includes refraining from making large inferential leaps from data to theory (ideas).

Can a Christian be a behaviorist? Yes, I think so, if by a behaviorist one means a careful, scientifically-minded methodologist. Can a Christian be a philosophical behaviorist? Perhaps not and here's why.

To deny the existence or the importance of what goes on within a person, specifically his mental contents, seems to fly directly in the face of biblical data. "As (a person) thinks in his heart, so is he" (Proverbs 23:7; KJV). "Out of the abundance of the heart the mouth speaks" (Matthew 12:34; KJV). "For we believe in our hearts and are put right with God; we declare with our lips and are saved" (Romans 10:10; TEV). Indeed, scriptural references to knowing God place a premium on events of consciousness, though we should not understand knowing to be exclusively cognitive. Thinking is necessary but by no means always sufficient for knowledge.

It is difficult to write an article such as this without paying at least passing note to the matter of determinism. While it has been maintained that a person cannot be both a Christian and a determinist, the issue is far from simple and it would be foolish of me to try to dispense with it in a paragraph or two. I will suggest that philosophical behaviorism may not rise or fall on the matter of determinism *per se* but rather on the nature of the determinism which is said to operate.[5] The Christian and the typical philosophical behaviorist usually run into trouble over materialistic determinism, whose adherents tend to discount the events of consciousness.

Each year I have the responsibility of teaching theories of personality to doctoral students in our clinical psychology program at Fuller Seminary, and each year I announce that the course is largely one in "clinical philosophy." I say this for two reasons. First, most traditional personality theories are not theories at all, in that they do not generate in any clearly specified way testable behavioral predictions. Second, most personality theories are riddled with metaphysical and ethical assumptions. I would insist that the practicing clinician finds it virtually impossible to avoid philosophic matters and, thus, has to operate on either an explicit or implicit personality theory of the sort I teach in my course. This, however, is not a matter of science. Clinical practice is an art based on the *application* of findings presumed to be scientific. All of this means that the next time you hear someone call himself a behaviorist, ask him what exactly he or she means. If the person with whom you are speaking means the use of principles and findings from behavioral science to conduct effective psychotherapy, fine. If he or she means the conduct of research according to behavioristic principles, fine also. But if he announces that he adheres to the reductionist assumptions of a thoroughgoing materialism, ask him if he is also a Christian. If he answers yes, I think you have found someone who has not yet resolved his theoretical inconsistencies.

There is no question now that behavioral principles and their application (behavior therapy) are exceedingly effective for treating certain kinds of disorders. There is also little question, at least in my mind, that methodological behaviorism is the only basis on which we can establish a scientific psychology. At the same time, a person is more than a chunk of protoplasm whose behavior has been shaped entirely by "its" reinforcement history. So, in answer to the question "Can a Christian be a behaviorist?," I suppose it all hinges on what you mean by "behaviorist."

References

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

A. Knopf, 1971).

[2]B.F. Skinner, *About Behaviorism* (New York: Alfred A. Knopf, 1974).

[3]I refer here to science narrowly defined. Although philosophers and psychologists hotly debate the nature of behaviorial sciences, a working definition might be "the systematic observation and interpretation of 'objective' data collected under controlled conditions." Thus, strictly speaking, to refer to "the science of mental life" is a *non sequitur* (though one might justifiably speak of "the science of verbal behavior"). Ironically, the workings of the mind (including feelings) are of crucial interest to most practicing psychologists.

[4]Unless, of course, one is deliberately studying cross-cultural differences.

[5]Some Christian thinkers, for example C.S. Lewis, strongly decry all forms of hard determinism. In his opening essay to *God in the Dock* (Grand Rapids: Wm. B. Eerdmans Publishing Co., 1970) entitled "Evil and God," Lewis puns, "If thought is the undesigned and irrelevant product of cerebral motions, what reason have we to trust it?" (p. 21). For a psychologist's treatment of kinds of determinism, see Joseph F. Rychlak, *A Philosophy of Science for Personality Theory* (Boston: Houghton Mifflin Company, 1968).

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American Events and International Missions

Most of us have grown up in the confidence that American personnel and American giving are what have maintained the world outreach of the Church of Christ. Many Christians in the United States have never recognized the relationship between events shaping our lives in the States and the increase or decrease of missions overseas. In this communication we brainstorm the question of what lies ahead for missions in the light of Stateside phenomena. The order in which we treat these "effects" is not one of priority or urgency.

1. *The Work-Ethic Breakdown:* In three years, the Ford Motor Company will implement the four-day, 32-hour work week. Within ten years, this work week will be nationwide. There will be repercussions in several directions. Some of the liberated workers will use the time gained for recreation or pleasure. Others will use it for working a second job. The net result from either response will be increased materialism, with the emphasis on the things money can buy. It is doubtful that missions will receive a slice of the additional income of a second job; those who use their time for more pleasure will probably not give as much as before the shorter workweek was initiated. With the increase of pleasure-seeking, not only will there be less money going for missions, there will be fewer Christians who respond to a call for workers.

2. *Women's Liberation:* As the roles of male and female become interchangeable in the States, there will be an increasing demand that women be given leadership roles in missions overseas. Field superintendencies, regional administrative posts, national and international councils—these will all be up for grabs. It is surprising that the present trend has been so slow in making itself felt on the mission fields of the world. After all, the number of women has been far greater than the number of men in general. A shift will certainly be coming. It is possible that one effect of this will be seen where men have hesitated to go to the field where they would of necessity be made leaders. These same men might very comfortably work under a woman's leadership. We may look for more female recruits as a result of this emphasis also.

3. *The Rising Divorce Rate:* More people are getting married now than were doing so 20 years ago, and they are marrying on the average one year later than they were 25 years ago. Nevertheless, more people get divorced in the United States than anywhere else in the world. The effect of this in missions is seen in the increasing number of divorced persons applying to missions as candidates. Missions are not yet at the place where they are prepared to handle this phenomenon. Must such persons be second-class Christians as far as their service for Christ is concerned? While Boards are not going to be publicising it, nor should they, they will be sending a growing number of divorcees to serve overseas. In addition to the mission board psychologist or psychiatrist, there doubtless will be a marriage counselor added to most staffs. Such a person has long been overdue on most fields.

4. *The Working Wife and/or Mother:* In the past decade, the national labor force of women has increased 42% while that of men grew 17%. The population grew 19%. This added pressure for women to become career-minded will keep some women from volunteering for overseas service. The options a young woman now has offering equal opportunity and equal pay will become an enticing attraction to many. For the furloughing family, there will be increased pressure upon the wife to add to the income by joining the secretarial force or substituting in public school teaching.

5. *Polls and Religious Surveys:* When the results of a recent Gallup Poll were announced, the Christian community was bewildered. We thought we were few in number and suddenly we were told that some 50 million Americans professed to have been born again! The reaction to this revelation may be positive or negative: there is vastly greater potential for missionary recruitment than we had suspected, on the one hand, but on the other why outreach to Americans missionarily if so many are already saved? Perhaps, too, there are many more overseas who know the Lord than we previously thought! Stateside, there will be less evangelism and more political activism; overseas, we shall probably get less recruits.

6. *Abortion:* Abortion is now the primary cause of death in infants! We will never know, of course, how many of the one million aborted infants of the past year, would have become missionary recruits. As this figure increases each year, the effect will soon be experienced in missions from the smaller work force in the country who are supporting missions financially. There will be a larger number of older people to be supported by a smaller number of people, and this will siphon off missionary giving also. The number of persons available to serve as missionaries will be smaller.

7. *The Pill:* The most natural by-product of the pill is the increased pleasure a couple may have in each other without fear of pregnancy. Thus, such a couple tends to become self-seeking and self-serving. We are not decrying the pill; it has been long overdue. The result, however, will be smaller missionary families and it is a fact that such families have in the past fed a great number of their children into missions.

8. *The Occult and World Religions Invasion:* Christians in the United States are increasingly aware that those of non-Christian faiths are all about them today; one does not have to go to the foreign fields to meet them. There is validity to the challenge that Christians should reach these people here on our doorstep. However, the emphasis of a few groups that this outreach is the only valid one today is entirely too one-sided! The net result of this invasion will be that a greater number of personnel will be deployed to work among such groups in the States who would otherwise have gone overseas.

9. *Long Continued Inflation:* This effect is wiping out the missionary dollar in some areas of the world. Americans have been slow to realize that the inflation crunch at home has its counterpart, sometimes in greater effect, in every part of the world. While church giving as a whole increased 8% in 1975, the actual result was a decrease of 1.2%, due to the inflated dollar. As this pressure increases worldwide, a smaller missionary force, more highly trained and strategically placed, will result. The general missionary will be replaced by technically equipped people able to reproduce themselves in the nationals.

10. *Rising Nationalism and Revolution:* Wycliffe Bible Translators, Operation Mobilization, and others are being expelled from some of their fields. Some Muslim countries are closing their doors slowly. In some countries where the church is strongly established, the pressure is on turning things over to that national church. These must be considered normal developments in our time and history. When revolution of a communist nature occurs, the entire missionary force is eased out in short order as we see now taking place in Angola and Mozambique. It has been the rule that expelled missionaries do not generally go to other fields but rather return to their homeland.

11. *The Petro-Revolution:* Ever larger numbers of American ex-patriates are working in the petroleum producing nations of the world. Because of the petrol-dollar, the non-professional missionary will be making his weight felt in foreign countries. Churches for such workers will be established but they are usually closed to the nationals. There should be an earnest effort to train such people to evangelize and to sacrifice in order to reach these target peoples for Christ. As the Third World nations are reduced

to begging for oil imports, they will more readily admit Muslim missionaries and more readily expel Christian missionaries where their national interest becomes involved.

12. *Age-Segregation:* As parents and relatives live longer, more missionaries are going to be kept at home to care for them. Although most of these aged will be in nursing and rest homes, the costs of maintaining them there will increase greatly, bringing tremendous pressure upon the missionary worker, particularly the single one. It is possible, of course, with the further development of the welfare state, that such persons will be provided for through national insurance of some kind.

13. *The Population Explosion:* Now that we understand there is no longer the fear on the part of the experts that the planet cannot support greater masses of people, we can anticipate that young couples will return to having more children. But that will not be for another 20 years. The immediate future of the family indicates a smaller one, with individuals marrying later and sharing in decisions. Overseas, the enormous population increases will dictate the deployment of radio and satellite TV outreach. Newspaper evangelism as practiced by AMG International will be enlarged still further. Training programs for nationals will be expanded; Theological Education by Extension will thrive in a variety of forms and in combination with formal educational plans.

14. *The Smaller Family.* Most missionaries come from a family larger than two children. Such children reach out less selfishly to others and yield more easily their rights to the Lord when it is a matter of Christian service. Smaller families will experience greater difficulties in responding in this generous fashion. In society at large, the notion of the family is so unpopular these days that a decision to have children, formerly a routine event in a young married couple's life, now requires an act of courage.

In summary, out of these American events will come a smaller work force in missionary enterprise but one which is more highly developed in intrapersonal skills and technical know-how. More American Christians will become witnesses at home to foreign students and other overseas visitors to their shores. They will contribute in a more informed way and become more conscious of the value of their investment in the ministries involved. The well-equipped missionary, with the ability to reproduce himself in others, will become the standard in most societies. These are not events to be regretted but rather to be adjusted to. They are reflections of what shape or shapes God is bringing missions to.

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Letters

Another Reply to Kathryn Lindskoog

Ms. Lindskoog (*Journal ASA*, March, 1977) apparently has some inaccurate views of the biology of reproduction. First of all, parthenogenesis does involve some aspects of fertilization. Fertilization stimulates the egg to develop; without fertilization, there is no development. A point that must be considered is that spermatozoa are not the only agents capable of triggering development. Mechanical stimulation of the egg can trigger development, although in higher animals this does not proceed to embryo formation. In the instances with which I am familiar of parthenogenesis in vertebrates, the mechanism appears to be either the failure of the first cleavage to complete or the recombination of one of the polar bodies with the egg cell. Either way, parthenogenesis in vertebrates results in diploid individuals. Of interest to me is that the offspring produced parthenogenetically are XX in chromosome constitution. For birds such as the turkey, which have been successfully produced in this fashion, the result would be a male. For mammals, with the opposite means of sex determination, the result would, in all cases, be a female. Historically, Jesus was a man. Parthenogenesis as we understand it today could not have resulted in his birth.

In answer to another point, Man has 46 rather than 48 chromosomes. A chromosome smear was miscounted and the figure of 48 appeared in scientific literature of the late 1940's and early 1950's.

Inasmuch as Jesus was truly God and truly man, it seems reasonable to assume that he was not only outwardly human, but genetically human. Therefore I believe that Jesus was diploid in chromosome number and did in fact have all the organs of a functional male. It seems rather farfetched to me to believe that Jesus produced sperm prior to his appearance on earth as a true man.

In conclusion, I feel there is no biologically satisfactory explanation for the virgin birth. As a Christian, it is reasonable for me to believe that Jesus' birth occurred as reported in Matthew without necessarily requiring a biological explanation for it. As biological knowledge expands, an explanation may be forthcoming, but for now faith suffices.

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The human process by which God chose to make his Word known in earthly languages is as crucial to our knowledge of what he is saying in Scripture as is our recognition of Scripture's full inspiration. The God who chose to speak to us through writers who lived in specific historical, social, cultural, and linguistic contexts has, by that method of speaking, determined how his Word is to be studied. Technical biblical scholarship, when it works correctly, is not a method imposed on Scripture from without. It is an approach demanded from within. In Genesis, God revealed the creation story over against a setting alive with belief in pagan deities and flooded by myths that described the beginnings of human life and history. How can we possibly catch the full thrust of those magnificent early chapters of our Bible if we do not see it against the Middle-Eastern social and religious setting which serves as their backdrop? The Genesis accounts of creation are not at all an academic account of our beginnings. They are a powerful sermon (almost a song) that celebrates God's power and glory over all the elements and objects of the universe which Israel's neighbors falsely worshipped.

David A. Hubbard

"The Current Tensions: Is There A Way Out?" in *Biblical Authority*, J. Rogers, ed., Word Books, Waco, Texas (1977), p. 161.

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