JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

An evangelical perspective on science and the Christian faith

(US ISSN 0003-0988)

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

VOLUME 34, NUMBER 1 MARCH 1982

MEMBER EPA EVANGELICAL PRESS ASSOCIATION

Concerning SUBSCRIPTIONS, changes of address, requests for back issues, and other business requests, address: Executive Director, American Scientific Affiliation, P.O. Box J, Ipswich, Massachusetts 01938. The SUBSCRIPTION PRICE: one year $18.00, two years $32.00. *Students:* $10.00. *Institutional rate:* one year, $32.00. *Gift subscriptions:* one year, $10.00. Single copies may be purchased at $4.00 each. Second class postage paid at Ipswich, Massachusetts and at additional mailing offices. Postmaster: please send POD form 3579 (change of address) to American Scientific Affiliation, P.O. Box J, Ipswich, Massachusetts 01938. Published four times a year in March, June, September and December by the American Scientific Affiliation. Telephone: (617) 356-5656. Back issues: $4.00 per issue from 1977 to present; $2.50 per issue from 1974 to 1977; $1.50 per issue from 1963 through 1973; $2.00 per volume or $1.00 per single issue before 1963; *Supplement* 1, 1976; $3.00.

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

Concerning MANUSCRIPTS, address: Editor, *Journal ASA,* 753 Mayfield Ave., Stanford, California 94305. All manuscripts should be typed double-space on good quality 8 1-2 x 11 paper, with references collected at the end, and with an Abstract of not more than 100 words. Duplicate copies of manuscripts are requested. Figures or diagrams should be clear, black and white line ink drawings or glossy photographs suitable for direct photoreproduction, with a caption provided separately.

REGULAR PAPERS represent major treatments of a particular subject relating science and the Christian position. Such PAPERS should be at least 10 pages and not more than 20 pages long. Accepted PAPERS will be published within 18 months.

COMMUNICATIONS represent brief treatments of a wide range of subjects of interest to the readers of the *Journal ASA*. COMMUNICATIONS must not be longer than 9 pages. Accepted COMMUMICATIONS will be published within 9 months.

LETTERS represent correspondence received by the Editor which comments on previous publications in the *Journal.* All correspondence received by the Editor is deemed suitable for the LETTERS category, unless the writer expressly requests that his/her letter be not published. LETTERS will be published within 6 months of receipt.

Concerning BOOK REVIEWS, address: Book Review Editor, Bernard J. Piersma, Frank J. Seiler Lab, US Air Force Academy, Colorado Springs, CO 80840. To avoid duplication in reviews, prospective reviewers should notify the Book Review Editor of their intentions at an early date.

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

MARCH 1982 PRINTED IN THE UNITED STATES OF AMERICA VOLUME 34, NUMBER 1

The Origin of Man

JAMES M. HOUSTON

Chancellor
Regent College
Vancouver, British Columbia
Canada

This paper is reprinted by permission from I Believe in the Creator, *by James M. Houston, published in 1980 by the Wm. B. Eerdmans Publishing Company, Grand Rapids, Michigan.*

It is widely assumed that man's origins determine his present significance. That is why *Roots* has aroused such a phenomenal interest. Doesn't man's ancestry determine so much of his nature and his needs? Since Darwin's views assumed man's origin from the apes, it is thought that a sub-human past leads to a less than human present. Certainly some Christians take this stand.[1] But the problem of origins is complicated, whether it is conceived empirically or theologically. The absolute origin of the universe is inconceivable, for we cannot conceive of the meaning and the process whereby God created space and time and all matter *ex nihilo*; we are not intended to by such a declaration! Creation therefore has to be a statement of faith, not an empirical deduction. We have a similar problem in relating to the origin of man.

We have some empirical evidence from the studies of fossil man that establish the presence of hominids one, two or even three million years old. Physical anthropology has sought to trace biological linkages in the skeletal forms of *Ramapithecus, Paranthropus, Australopithecus, Homo habilis, Homo erectus* and *Homo (sapiens) neanderthalensis*. Linkages remain uncertain scientifically.[2] But this whole evolutionary approach is bedevilled, not only by fragmentary anatomical understanding, but by the reductionistic approach that assumes a skeleton is a person. The origin of dead bones is a poor guide to the character of a living person. True, the early Palaeolithic period reveals that man was a stone-using creature who hunted big game; the middle Palaeolithic period shows that Neanderthal man used axes, while the upper Palaeolithic period reveals that

Homo sapiens had burial cults that reflected concern for the after-life.[3] But the origins approach to man still leaves us with vast ignorance concerning the nature of man as man.[4] This approach cannot help us explain why man, unlike all other animals, is one genus and one species, unique as no other creature is unique.

The biblical account takes a relational approach to the creation of man and gives a theological definition of how man relates to his Maker. The Bible is not really concerned with man's physical origins, but with his character before God, which in turn defines his uniqueness before all other created things. It tells us man is made from dust, which our mortality clearly reveals; thus our burial services are observed with the words 'dust to dust'. To say man is derived from the hominids is not to say anything more radical than the biblical description of man's dusty origins. But what the Bible has to say of man's relationships is revolutionary in relating a true understanding of his nature and responsibility.

A person, however, has a specific history. He is born, lives and dies. To regard the story of Adam and Eve as a myth is to shatter both the consistency and meaning of man as the agent of the events of history. Man today *is* responsible for sin, although he is also caught up in the groundswell of past evil, as 'the sins of the fathers are visited upon the children'. We therefore hold two truths in tension. Sin is a given element in life. Yet it is my responsibility. Too often Christians have talked loosely of the 'Fall' as a chronology of man as he once was—perfect—and man as he is now—depraved. The story of Adam and Eve is not a beautiful story of 'once upon a time'; it is about ourselves, how we are *now*. This present tense is given in Gen. 2:24 in the context of Adam and Eve. 'Therefore a man leaves his father and mother and cleaves to his wife, and they become one flesh.' This is a present reality.

At the same time, the historicity of Adam and Eve and the Fall has to be taken seriously, otherwise we are not in tune with the biblical writers. Luke, in his genealogy of Jesus, records Adam as historical along with the rest of the biblical characters (Luke 3:23-38). Likewise, Paul tells the Athenians that God 'made from one every nation of men to live on all the face of the earth' (Acts 17:26). He also declares that 'sin came into the world through one man' (Rom. 5:12). In this chapter, the apostle speaks of 'one man' eleven times, seven times referring to Adam, and four times to Jesus Christ. Paul clearly assumes Adam was as historical as Jesus Christ, who was actually born in Bethlehem in the reign of Caesar Augustus (cp. also 1 Cor. 15:21-22). Just as evolution is an approach that involves man in 'processes' but gives him no uniqueness as historically eventful, so myth may convey meaning but without the framework of space and time. The Bible speaks of both realities, of man's individual uniqueness and his personal responsibility, as he is caught up in the events of history.

Man, as the Creature of God

The true humanity of man is dependent upon God, not man. In other words, man is most truly understood in terms of theology, not anthropology. The latter may deal with the evolutionary schema concerning man's physique, or with the diversity of his racial origins, languages and customs. But the Bible alone confronts us with the direct issue: What is man? Four times this is asked (Job 7:17; Ps. 8:4; 144:3; Heb. 2:6). In Psalm 8 in particular this is set forth in the context of the joyful recognition of Yahweh's universal sovereignty:

> *O Lord, our Lord,*
> *How majestic is thy name in all the earth.*

Man as man is conceivable only within the context of the sovereign will and grace of the Creator. Man as man does not depend upon anything inherent in man, argues the Psalmist. For what is man compared with the majesty of the heavens—why should God pay any regard to man? Yet before man's head swells up too quickly over his status in creation, the Psalmist adds that God's glory above the heavens is chanted by babes, who cannot articulate any form of speech!

This is to say that God does not need man's innate abilities to manifest His glory. His glory is His mercy, revealed in His unmerited favour towards His creature man, to whom He gives all the special status man has in creation. What gives glory to God is therefore not man's strength and natural abilities, but his weaknesses, like 'babes and sucklings' wholly dependent upon the Creator. It is in his creatureliness that man is man. As the Russian philosopher Nicholas Berdyaev has said, 'God is more concerned about man's humanity than man is.'

It is a biblical principle that natural origins do not define our humanity in its spiritual dimensions. Within churches today, there are those who assume they are naturally Christians, *naturally* because they were christened at birth, enrolled in the church register and active in church affairs. The apostle Paul speaks against such an assumption when he says: 'For not all who are [genealogically] descended from Israel belong to Israel, and not all are children of Abraham because they are his descendants' (Rom. 9:6-7). Likewise John the Baptist says, 'Do not begin to say to yourselves, "We have Abraham for our father" [because they had been physically circumcised], for I tell you, God is able from these stones to raise up children to Abraham' (Luke 3:8). Can we therefore be 'naturally' human beings without the grace of God?

Left to ourselves, 'the fate of the sons of men and the fate of beasts is the same; as one dies, so dies the other. They all have the same breath, and man has no advantage over the beasts; for all is vanity. All go to one place; all are from the dust, and all turn to dust again' (Eccl. 3:19-20). 'Man cannot abide in his pomp, he is like the beasts that perish' (Ps. 49:12, 20). The biologist Dobzhansky has spoken graphically of the dust of our mortality:

> The aggregate volume of all the genes in the sex cells which produce the contemporary world population (of 4 billion) probably do not exceed the volume of a vitamin capsule. How precarious that this tiny mass contains all the biological heredity of the living representations of our species and the material basis of its future.[5]

Beyound our dusty mortality, man has a somewhat pre-

carious distinction from the animals. Significantly, he was created on the sixth day, when the animals also came into being. The well-known ethologist W. H. Thorpe has said:

> Forty years or so ago, psychologists and moralists used to list a number of ways in which animals are clearly different from man. It was said animals cannot learn; animals cannot plan ahead; animals cannot conceptionalise; animals cannot use, much less make tools; it was said they have no language; they cannot count; they lack artistic sense; they lack all ethical sense.[6]

We know that all these assertions are either wrong or at least debatable. Most of these differences are differences of degree. They do not really define the uniqueness of man. So ethology has become a good stick with which to beat the natural pride of man. There is a sense in which the Bible 'out-Darwins' Darwin concerning the origin of man. Darwin said man came from the monkeys; the Bible says man comes from the dust. So it is not Nature that has determined man's natural evolution as a cultural being: it is God. God alone keeps man from relapsing into the state of animality. Man without God—as the Oriental despot Nebuchadnezzar discovered—finds his kingship relapsing into the state of a beast of the field.

If God created the whole universe by the Word of His power, it is appropriate that man's unique dignity in creation should be the address of God spoken in grace. This is the theme of Psalm 8. Man is simply the creature that Yahweh relates to graciously, in remembrance and care. Man has been made the partner of Yahweh's earthly reign, so that in his transcendence over the rest of creation man evidences the immanent rule of God. Without God, man quickly falls into animality, as George Orwell shows in *Animal Farm*.

There is the road to animality in naturalism. 'Vive la vie naturelle', we are exhorted, for this is the pulse beat of humanity. So, 'be natural'. 'Let the hot blood course through your veins.' This mystique of 'the natural' leads to paganism.

There is the road to animality in aestheticism or hedonism. Man in discovering a reality beyond himself, and his instincts, is tempted to assume that what pleases him and gives comfort to him should be his guiding principles. The sexual obsession of our age reflects this philosophy. What is more beastly than pornography?

The Bible is not really concerned with man's physical origins, but with his character before God, which in turn defines his uniqueness before all other created things.

There is the road to animality in materialism. Our economic philosophy of 'dog eat dog' and 'the survival of the fittest', in the jungle warfare of seeking fat and fast profits, does not engender an ethos of humane tolerance and love of neighbour. Materialism does not produce socialism, otherwise Marxism would not seek in vain for the creation of the 'New Man' to bring about the revolution necessary for Utopia. The tiger of human selfishness is only made more powerful in a materialistic society.

Thus it is our human experience *now* that man is not man 'naturally' by evolution.[7] It is by election, by the free, sovereign grace of God, his Maker, that man is man.

Man, as the Image of God

Man as man implies sovereignty—sovereignty over his environment, over other creatures, over himself. Man's self-consciousness, his sense of uniqueness, his conservation of memory and culture, his tool-making ability, his capacity for thought and speech, the capacity he has to think abstractly and have self-knowledge—all evidence his sovereignty. He is unique also in his search for truth, in his ethical aspirations, and in his concern for moral values. That man can know God but can corrupt these God-like attributes must be recognised before man can be truly understood. Otherwise man is constantly deceived by his own powers, and disappointed by his own weaknesses.

As we have seen, Psalm 8 emphasises that human monarchy is grounded, not in human power, but in Yahweh's gracious sovereignty alone. God has caused man to have dominion, and God continues to crown man with the insignia of such an office.

> Yet Thou has made him little less than God,
> and dost crown him with glory and honour.
> Thou hast given him dominion over the works of Thy hands;
> Thou hast put all things under his feet. (Ps. 8:5-6)

James M. Houston is Chancellor of Regent College in Vancouver, British Columbia, where he previously served as Founder and Principal from 1970 to 1979. Dr. Houston is a geographer, holding the D. Phil. degree from Oxford University where he served on the faculty of Hertford College as Fellow from 1964 to 1970, and as Bursar from 1967 to 1970. He is the author of A Social Geography of Europe, The Western Mediterranean World, *and numerous articles in geographical journals and encyclopaedias. He is editor of* The World Landscape *series, and of* Crux, *the theological periodical of Regent College. Dr. Houston and his wife Rita have four children and one grandchild. He is Elder of Granville Chapel in Vancouver, an independent Bible Church Fellowship.*

There is the road to animality in naturalism, aestheticism, hedonism, or materialism.

No limits and no guidelines are set to man's rule, other than the implicit undertanding that the question 'What is Man?' is addressed to God and that it is God's sovereignty upon which man depends for his rule. In this spirit Solomon at the commencement of his rule could dedicate the temple saying: 'But who am I, and what is my people, that we should be able thus to offer willingly? For all things come from Thee, and of Thine own have we given Thee. . .All this abundance that we have provided. . .comes from Thy hand and is all Thine own' (1 Chron. 29:14, 16). All a man can do and give, in his self-transcending powers, is only possible because of the sovereignty of God's grace.

In the Genesis passages dealing with the *imago dei* (Gen. 1:26-27; 5:1; 9:6), there is also an implicit polemic that, unlike the myths of the ancient Near East in which the king alone is the god's deputy, all mankind is granted the status of kingship. Man, who is but dust—non-being—is enthroned by God to have identity and rule.[8] Indeed, under the theocracy all men are responsible as God's deputies.

The interpretation of Genesis 1:26-27 in terms of human dominion over creation has again been brought to attention by the environmental crisis. Some argue that this monarchical model of man is precisely what has bred human despotism over the earth, while others argue that it only reenhances the fullness of human responsibility.[9] As D. Cairns notes in his study, throughout history church leaders have given diverse interpretations of the *imago dei*,[10] especially when theologians have attempted to separate an understanding of 'image' and 'likeness'.

'Then God said, "Let us make man in our image, after our likeness" ' (Gen. 1:26). Is the 'image' the natural aptitude man has, despite the Fall, while the 'likeness' is what can only be supernaturally regained after the Fall? This medieval distinction was rejected by the reformers. Calvin believed the 'image' is still in all men who are sustained by the Word, recognising their being in the glory and goodness of God. Luther saw the 'image' as God's intention for man, restorable to believers, but attainable to man not by nature and reason, but only by faith.

The theologian E. Brunner has argued that a distinction should be made between 'image' as formal and as material.[11] Formally, all men, in spite of the Fall, still have superiority in creation, though this is understood not only in terms of the concept of human dominion, but also in the sphere of human responsibility. Man is a being subject, and responsible in freedom, to God. Formally, sin does not infringe upon the image; materially, man has completely lost the image, for he is a sinner through and through. Karl Barth criticised Brunner's distinction between the formal and the material image, suggesting that man's capacity to relate to God in the formal image introduces the innate possibilities of natural theology without the gift of God's grace.[12] Brunner answered that without freedom and responsibility man cannot be activated by the exercise of faith that responds to the grace of God. Clearly, then, the 'image' does entail awareness of man's unique status of responsibility.

This aspect of the *imago dei* as human responsibility is reinforced by the context of the phrase in Genesis 1:26. Unlike the creation of other creaures of whom it is said, 'And God said, "Let there be". . .and there was', the creation of man is introduced by the plurality of the majestic fullness and responsibility of God: 'Then God said, "Let us make man in our image". ...' This suggests a deliberate counselling of divine 'persons', and the responsibility involved. Clearly, then, this reflects upon the responsibility man experiences. In his exercise of freedom he responds to God and finds his unique status. Biblical man is essentially a commanded being, whose sense of obligation provides him with dignity and significance. Unlike Greek man, who is above all a rational being, biblical man is a being of whom demands are made. His central problem is not, 'What is being?', but rather: 'What is required of me?'[13]

There is a third aspect, however, implicit in the *imago dei*: man as a relational being.[14] In Genesis 1:27 we read, 'So God created man in His own image, in the image of God He created him; male and female He created them' (cp. Gen. 5:1). As Karl Barth emphasized, the 'image' is one of relationships: The relationship between male and female, e.g., points to the fact that man alone is not man. He is only a man when he is confronted with the 'Thou' before his 'I'. This in turn is a reflection of the eternal relationship within the Trinity, of God's 'I' and 'Thou'.

The image is twofold: vertically, man has been created to relate to God in fellowship; horizontally, man has been created to share with man in friendship. That man and woman were created as complementary helpmeets reflects on man's inability to live alone. Man has been created for personal existence, towards God and fellow man, the former providing the resources to demonstrate this realistically and practically to the latter. As the spirit needs the body, so man needs his relationship with God as well as his relationship to man to exhibit his full nature. For man was created in love, to be a being of love. How different, then, is man's life from the instinctive and natural life of the animals.

Man, as a Cultural Being

Significantly, man is created as the finale of creation. All is completed, and God sees it is all good. The seventh day, therefore, speaks of a completed world in which man is placed to enjoy richly all that God has done. This is the beginning of man's existence: to 'enjoy God forever', as the *Shorter Catechism* expresses it.

From a human perspective, we might think of the cosmic forces God released at creation. We see the mighty Pacific Ocean caught up in its endless motion of winds and currents, or the solar wind relentlessly pouring forth its thermal heat, or the expansion of the universe itself racing outward from its initial explosion. Has the Creator Himself

been caught up in these infinite dynamisms of power? Will He, like 'Organisation Man', for ever be on the treadmill of His own making? Clearly, the reality of the Sabbath rest denies this. In the sovereignty of His grace, He rests, and amazingly He purposes to rest in His fellowship with man.

It is as if all the bounded structures of the six days of creation, measured as they are by evening and morning, are focused upon and determined by the climax of this day of rest. It is 'a day' unlike all other days, for it has no bounds of evening and morning. It is limitless in its celebration of God's satisfaction with the goodness of creation, and above all with God's communion with man. It is as if the seventh day was designed for fellowship between God and man in the enjoyment of God's world. Man, like God, is a relational being, given the capacity to rest, to take time off, to live reflectively, playfully, adoringly, in the praise and adoration of his Maker. This, then, is the dignity of man. He is the worshipper of God.

Within our culture we have become caught up in a neurotic work ethic instead of an authentic leisure-work ethic. To absolutise the work of our hands and minds is not only idolatrous, but it gives man the false identity of *Homo faber*, as if man without God could make anything at all.

'Be still, and know that I am God' (Ps. 46:10), declares the Lord. In the rhythm of the week the Sabbath provides the starting point at which we can set our priorities clearly. Our significance, our identity, can only be in God. We commence the workaday world on Monday morning, giving work its authentic significance as a human mandate under God. But if work is the parasitic activity from which I extract my significance, then as a 'workaholic' I am no different from the poor alcoholic who lives on the bottle instead of in authentic personal relations. Solzhenitsyn describes a middle-aged woman surgeon in *Cancer Ward* in terms of *what* she is, rather than *who* she is. Strip her of her profession as a surgeon, and then who is she? No one! The creation narrative in Genesis thus emphasises that man is not defined by what he gives to his culture, for he gives significance to his culture and his works by who he is.

Moreover, the Latin word *cultura*, from which we derive our world 'culture', implies cultivation, not creation. Human 'creativity' is an idolatrous idea that needs a proper understanding. 'The Lord God took the man and put him in the garden of Eden to till it and keep it' (Gen. 2:15). A gardener is not a creator; he is a cultivator of the given realities of air, sunshine, rain, soil and plants. Likewise, man can be 'creative' only through the rearrangements he can make, whether it be with words as a writer, with musical notes as a musician, with paints and canvas as an artist, or with the laws of nature as a scientist. Man creates nothing. He simply re-arranges, re-fashions, re-designs the given realities of creation. Man merely has the ability to enjoy the fruits of God's creation, not to exercise god-like powers of creation by and for himself.

This creation ordinance teaches man that there are levels of knowledge, so that the I-it world of objective reality is not to be confused with the I-you realm of personal relationships.

Man was also given the cultural mandate to 'name' the animals. In Semitic thought, naming implied the ability to learn the inner secrets or essence of an object, just as man has such powers in science today. Man's power to so 'name' the animals was notably set in the context of his recognition of his own relational needs. He found no helpmeet in such knowledge. This creation ordinance teaches man that there are levels of knowledge, so that the I-it world of objective reality is not to be confused with the I-you realm of personal relationships. This is the confusion of spirit that Pirsig, Rayber and many other people today exhibit—seeing man as a thing: a sex object, a tool for production, an object of scientific investigation.

REFERENCES

[1]Philip E. Hughes, *Christianity and the Problems of Origins*, Philadelphia, Presbyterian and Reformed Publishing Co., 1964, p. 37.

[2]Wilfrid le Gros Clark, *Man-ape or Age man?*, New York, Holt, Rinehart & Winston, 1965.

[3]E. K. Victor Pearce, *Who was Adam?*, Exeter, Paternoster Press, 1969. He argues that Adam is the innovator of the New Stone Age, but this begs the question why Upper Palaeolithic man has this spiritual interest in the after-life, if he pre-dated Adam.

[4]The origins approach forces us to either scientific or philosophical approaches *per se*, for Scripture is silent about that approach. See D. Gareth Jones, 'Man in the context of evolutionary theory', in Carl F. H. Henry (edit.), *Horizons of Science*, New York, Harper & Row, 1978, pp. 36-62.

[5]T. Dobzhansky, *Mankind Evolving*, New Haven, Yale University Press, 1962.

[6]W. H. Thorpe, *Animal Nature and Human Nature*, New York, Doubleday, 1974, p. 271.

[7]No attempt is made in this work to deal with evolution as a scientific approach to biological knowledge. That is a scientific issue. What is attacked here is evolutionary humanism, a metaphysical faith that views man as only a natural product of materialistic processes.

[8]Walter Brueggemann, 'King in the Kingdom of Things', *Christian Century*, 10 Sept., 1969, pp. 1156-1166.

[9]See James Barr, 'The Image of God in the book of Genesis—a study in terminology', *Bulletin of the John Rylands Library*, 1968, pp. 11-21.

[10]David Cairns, *The Image of God in Man*, London, S.C.M., 1953.

[11]E. Brunner, *Man in Revolt*, trans. Olive Wyon, London, Lutterworth, 1947.

[12]Karl Barth, *Church Dogmatics*, trans. G. W. Bromiley and T. F. Torrance, Edinburgh, T. & T. Clark, 1958, vol. III,i, pp. 181-206; III,ii, pp. 44-45.

[13]A. J. Heschel, *Who is Man?*, Stanford, Stanford University Press, 1965, p. 74.

[14]David J. Clines, 'The Image of God in Man', London, *Tyndale Bulletin*, vol. 19, 1968.

Abortion: An Exercise in Biomedical Ethics

D. GARETH JONES

Department of Anatomy and Human Biology
University of Western Australia
Nedlands, Australia

Induced abortion is one of the most provocative ethical issues facing human beings. It elicits extreme responses, engenders passionately emotional reactions, raises perplexing philosophical and biological questions, places upon the medical profession the mantle of social control, and presents many ordinary people with one of the most pressing and pervasive of human dilemmas. The planned destruction of human life, for that is what the artificial termination of pregnancy amounts to, brings us face to face with the meaning and finiteness of human existence; it forces us to examine the control we exert over future human lives and the reasons for bringing yet-to-be-born beings into existence. When used as a means of genetic control, induced abortion highlights the sometimes conflicting interests of biological quality and human concern, aspirations after ideal human traits and valiant struggles against appalling deficits.

Fetal Development: Biological Considerations

Following fertilization of the egg by a sperm in one of the uterine tubes, cell division begins. After four or five days the fertilized egg is known as a blastocyst and arrives in the body of the uterus. Here it floats in the uterine cavity for a short time before implanting in the wall of the uterus. Implantation begins at about six days and is completed by ten days. During this period the cells divide steadily so that by the completion of implantation the blastocyst consists of around 150 cells.

Following implantation the outer layer of the blastocyst undergoes a series of changes which culminate in the formation of the placenta. A small proportion of the inner layer develops into the embryo, which is taken as the period of gestation between two and eight weeks after fertilization.

The first days of gestation are hazardous ones. Some 10% of fertilized ova fail to implant; of those which do so and become embryos, about 50% are spontaneously aborted, usually without the woman realizing what has happened. These early spontaneous abortions are generally due to abnormalities of either the embryo or its protective and nutritive surrounding structures. For instance, 5 - 10% of fertilized ova have chromosomal abnormalities, as against 0.5% of newborn children. As a result, 90 -95% of all conceptuses with these abnormalities are rejected as early spontaneous abortions.[1]

Eight weeks marks the end of the embryonic and the beginning of the fetal period. It corresponds to a stage of development when all essential internal and external structures are present in rudimentary form. The heart of the embryo is beating and the nervous system shows the beginnings of reflex responses to tactile stimuli. Fingers and toes are clearly defined; the head is fairly rounded and erect, but is still disproportionately large. The neck region has become established and the eyelids are becoming more obvious. The length of the embryo/fetus at eight weeks is approximately 3 cm, and embryologists usually describe an embryo of this age as having unquestionably human characteristics.[2]

By the tenth week the face of the fetus has a human appearance, and the genitalia have incompletely formed male or female characteristics. Bone and cartilage are recognizable by the twelfth week and a heartbeat can be detected. By the sixteenth week the eyelids, nose, mouth, lips, ears, fingers and toes are fully formed, and the skeleton shows clearly on X-ray films. Between seventeen and twenty weeks growth slows down, and fetal movements (quickening) are commonly recognized by the mother. Eyebrows and head hair are visible at the end of this period. The period between twenty-one and twenty-five weeks is characterized by a substantial weight gain, and the body is better proportioned than previously.

From twenty-six weeks onwards a fetus is considered potentially viable. This means a fetus can survive if born prematurely, although the mortality rate is high because of

respiratory difficulties. Survival is possible at this age because the central nervous system has matured sufficiently to control rhythmic breathing and body temperature.

Fetal Development: Ethical Considerations

Basic to all arguments on abortion is the status of the fetus—as a human being or a person. These terms tend to be used more or less interchangeably, the presupposition being that once a fetus can be classed as a human being or person it is eligible to the protection normally afforded human beings or persons.

I shall assume that fetuses are human beings, in that they are genetically part of the species, *Homo sapiens*. The issue then becomes whether a fetus at a particular stage of development is a *person*, in the sense that it has as strong a claim to life as a normal adult human being. Such a claim to life entails the claim to be nurtured, as well as the claim not to be killed.[3]

A frequent framework within which this debate is carried out is to consider the options provided by prominent embryological landmarks. The question asked in this instance is: "*When* does the fetus *become* a person?" The possibilities opened up by this approach are: (1) conception; (2) implantation at six to ten days; (3) the transition from embryo to fetus at eight weeks; (4) quickening at approximately twenty weeks; (5) viability at around twenty-six weeks; (6) birth; (7) a year or so after birth.

Whichever of these options is adopted, the fetus is regarded as a non-person prior to a particular stage of development and fully personal following it. A line is drawn at some stage during development, this stage serving as a transition between two quite different preceding and subsequent states. This transitional stage, wherever it is drawn for whatever reasons, has enormous repercussions for ethical concepts as well as for legal and social attitudes. Taken together, these options constitute the *critical stage* approach to an assessment of fetal status.

Prior to the critical stage, the fetus has no claim to life. With its onset, however, it acquires a claim to life virtually as strong as that of an adult human. Regardless of when the critical stage is placed, therefore, considerable moral weight is placed on it. Consequently, the criteria used to determine the critical stage become central to the debate.

An alternative approach is to regard the fetus as a potential person. According to the *potentiality principle*: "If, in the normal course of its development, a being will acquire a person's claim to life, then by virtue of that fact it already has some claim to life."[4] In terms of this principle, a potential person is an existing being which, while not yet a person, will become an actual person during the normal course of its development. A human fetus is a potential person, in contradistinction to an actual person (a normal adult human being), or a being with a capacity for personhood (a temporarily unconscious person), or a possible person (a human sperm or egg) or a future person (a person in a future generation).

I shall assume that fetuses are human beings, in that they are genetically part of the species, Homo sapiens. *The issue then becomes whether a fetus at a particular stage of development is a* person.

The potentiality principle asserts that potential persons, such as fetuses, have a claim to life, whereas possible persons cannot exercise such a claim. Furthermore, it accords full personhood to those with a capacity for personhood. On the other hand, the claim to life of a potential person may be weaker than that of an actual person.

The potentiality principle takes seriously the continuum of biological development, and refuses to draw an arbitrary line to denote the acquisition of personhood. At all stages of development the fetus is on its way to personhood and, if everything proceeds normally, it will one day attain in its own right full personhood. The fetus is regarded as part of a continuing process, the end-result of which is the emergence of an individual human being characterized by human personhood.

Inherent in a potential person is a high probability of future personhood. With this goes a claim to life and respect, a claim that in very general terms may be proportional to its stage of fetal development. The claim is always present but, just as the probability of an older fetus becoming an actual person is much greater than that of a zygote becoming a person, it becomes stronger with development until at birth "the potential person attains properties and relationships so close to those of actual persons that the consequences of killing at this point are practically the same as killing young persons."[5]

These approaches encompass all attitudes to induced abortion. However diverse attitudes may be, and regardless of whether they have a Christian base or not, they can be analyzed within the various critical stage and potentiality frameworks. The onus on Christian ethicists is to determine which framework (a) is the most compatible with a high view of the fetus; (b) allows the fetus to be viewed alongside the needs of actual persons also involved in decisions regarding the fetus, and (c) has sufficient flexibility be be applicable in a consistent manner in practice.

Induced Abortion: Various Options

Of the options presented by a critical stage approach, the two most frequently-held critical stages are conception and birth. Dissimilar as these are, both entail absolutes. The view that the fetus has the status of full personhood from the moment of conception implies *absolute protection* for the fetus at every stage of its development. By contrast, when birth is equated with the attainment of personhood, the fetus is regarded as an integral part of the mother—entirely dependent upon her in status as well as function. On this view the mother is given an *absolute right* to decide

The purposes God may have for a fetus or adult are regarded as irrelevant to humanistic objectives. . .This one-dimensional view of human existence falls far short of the multi-dimensional perspective of humans in the image and likeness of God.

whether or not she wants the pregnancy to continue; the fetus has no rights or claims of its own and is to be disposed of entirely as the mother pleases.

The emphases placed upon conception and birth correspond, respectively, to the Roman Catholic and elective abortion positions, perhaps the most influential viewpoints on abortion in developed societies. It is to these I shall first turn.

Elective abortion

This position follows from bestowing upon the fetus a non-personal status; abortion on request is the logical practical outcome. There need be no therapeutic rationale for abortion, which should be carried out solely at the mother's behest. This is the position frequently associated with women's liberationist groups, while one of its ablest and staunchest exponents is ethicist and theologian, Joseph Fletcher.

While conceding that a human fetus is of the species, *Homo sapiens*, Fletcher contends that the fetus is not a person "since it lacks freedom, self-determination, rationality, the ability to choose either means or ends, and knowledge of its circumstances."[6] He adopts this position because, in his eyes, the essence of a person is reason, and "humans without some minimum of intelligence or mental capacity are not persons."[7] More specifically, he considers a score of twenty on the Binet I.Q. scale as a base line for personal status. A fetus cannot meet this test, and hence is not a person. Similarly, a fetus lacks the other traits considered by Fletcher as necessary components of the *humanum*, including curiosity, affection, self-awareness, self-control, memory, purpose and conscience.

The practical consequences of adopting a non-personal view of the fetus are far-reaching. Fletcher writes: "The ethical principle is that pregnancy when wanted is a healthy process, *pregnancy when not wanted is a disease*—in fact, a venereal disease. The truly ethical question is not whether we can justify abortion, but whether we can justify compulsory pregnancy."[8]

Somewhat similar arguments are used by Fletcher when discussing infanticide or, as he terms it, postnatal abortion.[9] Both can be justified if and when the good outweighs the evil, because neither abortion nor infanticide is, as such, immoral. From this it follows that competing values have to be considered, value being assigned to the *quality* of human life rather than the state of merely being alive.[10] Unfortunately, judgements concerning what is good or evil, and whether continued existence of a deformed or unwanted infant is justified, are relative matters and, in turn, raise ethical dilemmas of untold dimensions.

Fletcher's absolute position blinds him to any appreciation of a fetus' potential for personhood. Since a potential person is not an actual person, it is a non-person. Hence, there is nothing in between a being with rights and a being without rights. For Fletcher, the only test of personhood is rationality; failure to meet up to this test indicates absence of personhood and, one imagines, the forfeiture of a claim to existence.

At no point does Fletcher seek to incorporate within his approach a supernatural dimension. The purposes God may have for a fetus or adult are regarded as irrelevant to his humanistic objectives. His deliberate effort to humanize decision-making is offset by a relative disregard for fetal life, and he fails to justify his fundamental postulate that the essence of a person is reason. This one-dimensional view of human existence falls far short of the multi-dimensional perspective of humans in the image and likeness of God.

Beyond this, it contravenes the essential Christian principles of the dignity and worth of *all* individuals and potential individuals, because it makes no attempt to balance the claims of different individuals and conflicting interests. It pays no regard to the need to work out what it means to *be* human in this situation, accepting that whatever the mother desires is automatically granted. Implicit in this response is a denial of the concept of wholeness in the mother's life, and a disregard for the integrity of the family unit and the reciprocity of its members. In claiming to free the mother to be herself, it shackles her to a self-centered existence in which she herself and her own interests become all-important to the exclusion both of the legitimate interests of those around her and of the demands of God.

Inviolability of fetal life: Roman Catholic position

The Roman Catholic position on the inviolability of fetal life began to take definite doctrinal shape in the seventeenth century. Ideas prior to this time are important, however, many of the most influential ideas in Christian circles originating with the Church Fathers, whose concern was with the origin of the soul and its time of union with the body.

Four major ideas stem from the Church Fathers. *Traducianism* (*generationism*) is attributed to Tertullian. According to this the soul comes into existence with the body as a biological transmission from Adam via the parents. This fitted in well with the doctrine of inherited original sin. *Creationism* stemmed from Clement of Alexandria, who held that the soul was immediately and directly created by God in each fetus. A third alternative was that no soul is present in the fetus until the moment of quickening, and among the proponents of this view was Augustine of Hippo. A fourth possibility was put forward in an incidental manner by Gregory of Nyssa, who used the distinction between 'fully' and 'potentially' human; for him, the unform-

ed embryo is a potential human being. A similar position was espoused in the fifth century by a set of writings, the Irish Penitentials. These graded the severity of their penances as follows: "The penance for the destruction of the embryo of a child in the mother's womb, three years on bread and water. The penance for the destruction of flesh and spirit (i.e. the animated fetus) in the womb; to do penance for fourteen years on bread and water."[11]

This distinction between *fetus animatus* and *fetus inanimatus* persisted unbroken in the Roman Catholic tradition until the late nineteenth century. For instance, Thomas Aquinas in the Middle Ages proposed that the soul is created some time after conception. This was the predominant medieval view, which leaned heavily on the Aristotelian tradition of delayed animation. According to this, animation occurs at around forty days gestation in the case of a male fetus and eighty days in a female. For Thomas Aquinas, it is at these times that the soul is 'infused', respectively, into male and female fetuses.

Except for three years between 1588 and 1591, no major shift towards absolute protection for every stage of fetal development occurred in Roman Catholic thinking until 1679. In that year a decree by Pope Innocent XI condemned what he regarded as certain erroneous views on abortion, and in this we may have the seeds of an absolute protection position. However, it was only with decrees of 1884, 1889 and 1902 that absolute prohibitions against the destruction of fetal life under *any* circumstances were issued by the Roman Catholic hierarchy.

More recently Pope Pius XI in a 1930 encyclical emphasized the inviolability of fetal life on the grounds that it is equally sacred with the life of the mother. Canon 747 is even more explicit. According to this: "every aborted fetus shall be baptized without any condition, if it is known with certainty that it is alive, no matter at what period of gestation it is aborted. . . The obligation imposed extends to even the smallest fetus, even though it be aborted immediately after conception."[12] For Roman Catholic moral theologians, to abort a fetus with full knowledge and free consent is to commit murder. This is consistent with the Roman Catholic view that an unborn child is a human person with all the rights of a human person, and this status applies from the moment of conception.

In spite of such assurance on the absolute prohibition of abortion, the Roman Catholic position is not always absolute. The inevitable practical dilemmas associated with abortion are bypassed by distinguishing between *direct* and *indirect* abortion. Of these, it is the direct variety that is prohibited, namely, any action having as its primary aim a deliberate attempt to kill the fetus. On the other hand, *indirect* abortion is allowed. This occurs when an action has the secondary effect of expelling or destroying a fetus, and is justified under the principle of double effect. If, therefore, an action has two effects, one of which is good and intended, and the other evil and unintended, it is justified. The result of this principle is that if an action has the saving of the mother's life as its primary effect, it may be justified even though the death of the fetus may be the secondary effect. In a similar way, Roman Catholic doctors and nurses may participate in abortions if they do so only for a serious reason, such as grave inconvenience to the surgical team or a threat to one's professional future.

The major attraction of the Roman Catholic position for Christians is its high view of human life. It has the strengths of all absolute positions and it places the unborn directly in God's will. In practice, however, issues are often not this simple, and while we may wish to believe that abortion is always morally wrong, dilemmas abound. These are inevitable, and the ethical principles we adopt should be able to accommodate them.

The Roman Catholic position bypasses the dilemmas, and in so doing contorts the absolute nature of its protection of the fetus. It does this, not by appealing to personal responsibility, but by insisting upon rightness or wrongness as intrinsic qualities of certain actions.[13] This vitiates human judgement and makes God's will far more relative than its dogma suggests.

The purported rigidity of Roman Catholic reproductive ethics is based on natural law. A fetus, once conceived, has the right to develop; this is an expression of natural forces and is a duty allotted to the mother by nature. Taken to its logical conclusion, this leaves no room for human responsibility. Instead, the erratic and impersonal forces of the natural environment are allowed sway. This bears little resemblance to the biblical emphasis on the responsibility God has bestowed upon mankind to control his environ-

D. Gareth Jones is Associate Professor and Head of the Department of Anatomy and Human Biology at the University of Western Australia. His research interests center on neurobiology, in which he is particularly concerned with developmental aspects of the synaptic connections between nerve cells. He has written three books and 100 papers on neurobiological topics. In addition, he is actively interested in biomedical ethics, especially in the neurobiological and genetic areas, and in creation-evolution issues. Besides Our Fragile Brains, *Dr. Jones has written books on Teilhard de Chardin and genetic engineering. He is currently working on a book dealing with ethical issues in biomedicine.*

ment. Certain facets of future human life, as much as the ecology, have been given over to human control because man is no less than God's viceregent.

Inviolability of fetal life: Paul Ramsey

Paul Ramsey is an ethicist of considerable perception, whose views have exerted immense sway in many areas of biomedical ethics. His writings on abortion are scattered and are frequently critiques of the views of other ethicists. It is difficult, therefore, to gain an overall perspective of his position.

An underlying principle for Ramsey appears to be that it is relatively unimportant to establish at what point during gestation a fetus becomes human. The reason for this is that, in Ramsey's words:

> The value of a human life is ultimately grounded in the value God is placing on it. . .Human sacredness is not composed by observable degrees of relative worth. . .No one is ever much more than a fellow fetus; and in order not to become confused about life's primary value it is best not to concentrate on degrees of relative worth we may later acquire. . .[14]

Distinctions between humans, pre- and postnatal, are relative. God values all humans, no matter at what stage of development they are.

This argument leads to the inevitable conclusion that, when two lives are in conflict, both are of equal sanctity. Under most circumstances, therefore, Ramsey is driven to adopt the Roman Catholic distinction between direct and indirect abortion, only indirect abortion being permissible. The only exception is when both fetal and maternal lives are in danger. In this instance, he allows for the killing of the fetus. Even here, however, he reiterates that the motives towards both fetal and maternal lives should be identical. This being so, it is not clear what ethical principles he is using to decide in favor of saving the mother's life. Apparently, it is simply that the fetus is aggressing against the mother, and direct abortion is the only available means of saving this life. This argument does not circumvent the difficulty, however, that the fetus is innocent and an innocent life is being taken even if, according to Ramsey, the intention is only the incapacitation of the fetus. It is difficult to escape the conclusion that these are abstract semantics, of little value in practical decision-making in conflict situations.

In further writings Ramsey has been prepared to commit himself to a point at which fetal life should be given protection and accorded the sanctity and dignity of a human person. He opts for the blastocyst stage, arguing that this is the point at which the first origins of *individual* life can be established. This is the earliest point after conception and prior to birth when, in Ramsey's opinion, an individual human life begins to be inviolate. Before the blastocyst stage it is uncertain whether there will be twinning, while by the late embryonic stage the major functioning organ systems are established.[15]

In taking this stance, Ramsey has much in common with the genetic school although, in practice, he refuses to accept conception as the starting-point of individual human life. In some respects he gives the impression that the precise point is not important. What is important is that the particular point represents the beginning of human life and hence the beginning of the dignity and sanctity of that life with its moral claim to respect and protectability. Ramsey's concern is with the intimate connection between human life and equal worth—the onset of the one inevitably entailing the onset of the other as well.[16]

It is significant that no biblical text forbids procuring an abortion. . .The Old Testament does not equate the fetus with a living person; it does, however, place great value upon it.

In spite of this, Ramsey places considerable store by the significance of the blastocyst stage as the origin of human life. This enables him to class intrauterine devices and any 'morning after' pills that may be developed as legitimate contraceptives. In no sense are they abortifacients since the pre-blastocyst stages are 'prehuman organic matter'; they represent potential individual human life, thereby for Ramsey removing them from the realm of ethical dilemma.

Ramsey's aim is to define the outer limits of the human community. Having done this, his intent is to see that all members of that community are treated with equal justice; human beings must not be competitively evaluated. All are equal from the blastocyst stage throughout fetal and postnatal life and then through to old age. Against the background of this guiding principle he deprecates the developmental school, which assigns degrees of value to the fetus at different stages of development. For Ramsey there is not a gradation of values; there is equal value or none at all.

Ramsey espouses a form of genetic determinism.[17] The genetic composition of a fetus is, according to his view, definitive of that life, rather than preconditional for that life. Once a blastocyst is in existence, all considerations other than the survival of that life become irrelevant—with the one exception previously mentioned. That life must continue, because it is equal to all other human lives. No guidance is provided for dealing with the human and social conflicts that sometimes arise, even when those conflicts are of a genetic nature. The existence of a blastocyst predetermines all future actions, even when its effect is to mitigate reconciling therapeutic and compassionate actions. Unfortunately, irremediable conflicts do arise, and an intransigent emphasis on genetic existence *may* in some instances over-rule profoundly human considerations.

Limited abortion: Helmut Thielicke

Helmut Thielicke appears to start, like Paul Ramsey, from the premise of the inviolability of fetal life. In *The Ethics of Sex* he writes: "The genesis of human life is a

sacrosanct domain which dare not be invaded by human hands."[18] This follows from the orders of creation and redemption. The 'alien dignity' bestowed upon human beings by God, that is, their value in his sight, commences at the fetal stage. An allied consideration, according to Thielicke, is that once conception has occurred the man and woman involved have *become* parents. This means that "the office of fatherhood and motherhood has been entrusted to the parents and that they are now enclosed in that circle of duties which obligates them to preserve that which has been committed to them."[19] Parenthood is a gift of God and is not to be lightly spurned.

Thielicke's emphasis on the inviolable nature of nascent life stems from a biological foundation. In rejecting the older Roman Catholic emphasis on animation, he considers that the fetus throughout its development has "its own autonomous life, which, despite all its reciprocal relationship to the maternal organism, is more than a mere part of this organism and possesses a certain independence."[20] This, however, is a precarious foundation on which to build an ethical system, as the fetus is not autonomous in any biological sense—even after viability. Neither, indeed, is the infant or young child autonomous, except in a highly relative sense. More specifically, Thielicke argues that it is the possession of a circulatory system and brain that establish the fetus as a human being. This, as Joseph Fletcher cogently argues, is hardly a satisfactory definition of a human being, and is of no value anyway for the first six weeks of development when they are present only in the most rudimentary of forms.

The fetus, throughout its development, is important. Its potential for personhood marks it off as an entity of significance and potential dignity.

Thielicke's position up to this point has much in common with contemporary Roman Catholic dogma. However, when confronted by the borderline situation of conflict between the lives of mother and fetus, he refuses to follow the inexorable logic of Roman Catholic casuistry. Instead of arguing that the mother's life is of greater value than that of the fetus and that the latter may be indirectly destroyed, Thielicke resorts to the notion that we live in a fallen world. Conflict between one life and another can occur only in a fallen world; it could not have occurred in the original order of creation. What this means is that it is illegitimate to use principles based on the original created order to resolve issues of conflict. What we see in the world as disorder does not reflect God's creatorhood or will, and so we must expect a conflict of values.

For Thielicke there is an incommensurability between God's perfect will and the options and alternatives available to us in decision-making crises in the real, fallen world. We cannot decide with precise theological exactitude what course of action to follow when maternal or fetal life is at stake. The order of creation would, according to Thielicke, demand that nature take its course, and that maternal and/or fetal life be lost. This, however, is inappropriate in a fallen world and a responsible choice has to be made. For Thielicke, theological ethics do not provide a right-wrong answer in such a borderline situation. There is no easy solution, and whatever course of action is taken—sacrifice of her own life on the mother's part or abortion—will incur guilt. We must live in the light of God's forgiveness and we must exercise our freedom. Thielicke rejects the arbitrary decisions of rigid dogma, contending instead that in these conflict situations we are forced to exercise the costly freedom that is imposed on us "in the twilight zone between creation and Fall."[21]

In the end, therefore, Thielicke allows for abortion in borderline situations admitting that, within his basic affirmation of the sacrosanctity of fetal life, quantitative differentiations have to be made between conflicting lives. Decisions have to be taken; responsible choices must be made. He realises the dangers inherent within such decision-making, and yet contends that where conflict exists onerous choices are obligatory.

Thielicke's yearning for maintaining the dignity of human life, including that of the fetus, shines through his writings on abortion. This, taken with his emphasis on the responsible use of decision-making, constitutes an essential base for any approach to therapeutic abortion. Unfortunately, Thielicke's task has been made harder by his somewhat arbitrary decision that all fetal life, irrespective of the stage of gestation, is equally human. Even he appears ultimately, although not explicitly, to soften this by introducing quantitative criteria for deciding on a course of action in conflict situations.

A predominant impression left by Thielicke's handling of abortion is its vagueness. This stems from his inability to come to terms, at a practical level, with the reality that fetal life cannot always be accorded sacrosanct status. Perhaps this, in turn, stems from a fundamental error, namely, that the fetus may not have the status he ascribes to it.

Biblical Principles

Biblical data directly relevant to abortion are scant, although no biblical passage either speaks of humans possessing personhood before birth or condemns abortion as murder. The passage most commonly quoted is Exodus 21:22-25. This reads:

> If men who are fighting hit a pregnant woman and she gives birth prematurely (she has a miscarriage) but there is no serious injury, the offender must be fined whatever the woman's husband demands and the court allows. But if there is serious injury, you are to take life for life, eye for eye, tooth for tooth, hand for hand, foot for foot, burn for burn, wound for wound, bruise for bruise. (N.I.V.)

According to most translations and most commentators, this passage explicitly distinguishes the killing of a fetus from murder, on the ground that the fetus is not equivalent to an adult human life. The destruction of the fetus is not a

capital offence, whereas the death of the woman is regarded as such. In contrast to the mother, the fetus is not regarded as a soul (*nephesh*), and greater worth is placed on the mother as fully personal than on the fetus she carries. Loss of a fetus merited a fine, whereas the killing of a baby, child or adult, led to the death of the murderer (Exodus 21:12).

A few writers on abortion attempt to nullify the implications of this passage by suggesting that the translations we have are misleading. For instance, one re-translation reads: "If men strive and hurt a woman with child, so that her children come out of her, and yet no mischief follow, he shall be surely punished. . ."[22] Calvin's views on abortion are sometimes mustered as support, as he also interpreted this passage as teaching that fetus and mother were regarded as equal. And yet a reading of Calvin's comments on the passage show that his conclusions were based on an emotional antipathy to abortion. He fails to put forward convincing exegetical reasons for his interpretation. It must be concluded, therefore, that equating the status of fetus and mother in this Exodus passage is an example of special pleading.

It is also significant that no biblical text forbids procuring an abortion. This is in striking contrast to Assyrian law between 1450 B.C. and 1250 B.C., prescribing death by torture in cases or induced abortion. The silence of the Old Testament is notable, particularly since the Mosaic Code is normally more extensive and severe than other Codes in sexual matters. From this negative evidence it is not unreasonable to infer that God does not invariably prohibit abortion.[23] Never in the Old Testament is a fetus exacted for a fetus. This stands in contrast to the Assyrian Code, and was probably a means of protecting the fetus. Then again, conception is repeatedly recognized as a gift of God, for example, Genesis 4:1, 16:2, 17:19, 29:31, 30:22; Ruth 4:13. It is an act of creation in which humans play an essential part. Even beyond this, we have indications in the Old Testament that God is actively involved in fashioning the fetus, for example, Psalm 139:13-18.[24]

The Old Testament does not equate the fetus with a living person; it does, however, place great value upon it. It presents us with a delicate balance, and not with hard-and-fast rules. The fetus cannot be equated with a living person, and yet it is being built into the image and likeness of God. At no point in this process is it ever an expendable tissue of a human body, because God is at work fashioning it into a being with God-like characteristics.

If God is at work in the fetus, what clues does this provide in our search for an abortion ethic?

God is the creator of all human life and human beings are created in his image, with an abundance of God-like attributes and the capacity of responding to God and relating intimately with him. Human beings are like God in that they are persons, who relate to everything in personal ways. They are rational and moral beings, with moral responsibility and freedom of moral choice. They are responsible beings, responsible for their own actions and for the created order over which they have dominion.

To exercise authority over everything else created by God is a privilege and duty given only to God-like beings (Genesis 1:26). It involves intellectual ability, far-sightedness, initiative, creativity, moral concern, freedom of action, knowledge of the ways of God, dependence upon God, loving kindness towards the weak and perhaps above everything else an acknowledgement that all these powers come from God and are to be utilized wisely in his service. Underlying all these traits is God's treatment of humans as beings capable of deciding issues morally and rationally (Genesis 2:16, 17). Human moral obligations, however, are always related to the dictates of God, so that in responding humans become more like God.

As we consider the fetus, therefore, we also have to consider those other human beings implicated in decisions concerning its welfare and future. The fetus is on its way to full personhood and that potential demands respect. Actual persons are also implicated, and their responses as persons cannot be overlooked. God is involved, and the purposes he may have for the fetus and those surrounding the fetus constitute an essential paradigm for any decision-making.

Authentic human life, is, in the words of Matthew 6:25, more than food and the body is more than clothing. To be a human person entails more than merely having a human body. It is to be dependent upon the activity of God in establishing a relationship with himself and with fellow humans. These constant spheres of interaction lead to growth of personality, self-awareness and human relationships, through which we begin to perceive the meaning of personal existence.

Abortion, therefore, presents us with a dilemma. On the one hand, we do not have a biblical warrant to class it automatically as murder; and yet, alongside this, we must cling to the seriousness of abortion. Induced abortion is a man-initiated process by which a potential human life is destroyed. A developing person, or if you like, an undeveloped person is prevented from developing further and from becoming a human being in the fullest sense of this term.

And yet there is no way out of this dilemma. It is basic to personhood and to the responsibilities God has bestowed upon human beings. The dilemma is further compounded by the fallenness of the human condition. Our highest ideals are frequently shattered by self-centeredness, pride, arrogance, deception and lust, and the consequences for fetuses and children may be tragic.

The question of abortion confronts us with the grandeur and tragedy of the human situation. To expect trite answers in this realm is to demean the magnificence of God's creation and the vast ramifications of man's rebellion against God. Any approach to abortion that takes seriously the meaning of human existence must rely, in the words of Harmon L. Smith, on "human reason, compassion. . . understanding, and all else that constitutes our creaturely apparatus for making morally sensitive and discriminating and finite judgments."[25] The same writer comes to the following conclusions:

We repudiate tyranny in all human relationships; fetal tyranny, merely because it is fetal, is no exception. Moreover, we cannot hide behind the facade of impersonal nature or a *Deus ex machina* as justification for indecision and inaction. Direct abortion, when it is unavoidable, is no more than honest confrontation with this fact of our creatureliness and the dilemma of limited alternatives. We might wish the alternatives were different, or that our choice-options were larger; but wishing does not make it so."[26]

If our approach to the issue and to individuals involved in making decisions is to be a truly Christ-like approach, it must be characterized by compassion.

A Perspective on Abortion

Each fetus is a human life and represents a potential for personhood from very early in development—from about one week onwards. From this early stage it is a potential person, and from about eight weeks onwards it has a recognizable individuality as manifested by its circulation and brain activity. It is on the road to full personhood. Does this inevitably lead to a position of absolute protection for the fetus?

A rationale for fetal protection

A fetus is part of a continuum, the end-result of which is the emergence of an individual human being manifesting, under normal circumstances, the myriad facets that go to make up personhood. The processes of this continuum, however, do not begin at conception; neither do they end at birth.

They commence prior to conception, either in the love of two people for each other or in the lust of one person for another. Not only this, but in a very real if profoundly mysterious sense these processes commenced in eternity, at least for God's servants and when considered in hindsight. It was the Lord himself who said to Jeremiah: "Before I formed you in the womb I knew you for my own; before you were born I consecrated you, I appointed you a prophet to the nations" (Jeremiah 1:4, 5). We dare not overlook the sovereign purposes of God, although the manner in which these purposes and human responsibility interact has not been elucidated and perhaps—by its very nature—is incapable of elucidation. From a human angle, we are to exercise responsibility in our decision-making and under no circumstances are we to procreate life irresponsibly[27] or selfishly for that is to pour scorn on one of God's most precious gifts to mankind. The beginning of the fetal continuum receives far too little serious moral thought, both inside and outside marriage.

The other end of the continuum is also somewhat nebulous. A new-born baby is a very incomplete human person, with an enormous amount of biological development, range of environmental influences and wealth of educational experiences still required for normal maturity and growth. These constitute some of the relationships so necessary for the developmental continuum to be brought to fruition. Birth may signify the end of fetal life, but in terms of overall development of a human being it fades into comparative insignificance. Neither a fetus nor a child is merely a biological organism; each has before it the goal of wholeness as a member of the human community, but for this to be achieved nurture and protection, care and guidance, love and discipline—both human and divine—are needed.

To contemplate a fetus, therefore, as if it had attained mature personhood, in the sense in which older children and adults have, is misleading. The fetus is on its way to becoming an actual person, but as a fetus it is a potential person. What this implies is that, as we consider the personhood of a fetus, we rely heavily on its future potential. As it develops, less weight is placed on future potential and more on actual status, and this continues until adulthood is reached. The fetus, therefore, is an integral part of the human endeavour, and yet we must beware placing greater value on it than on human life after birth.

A corollary of the continuum-potentiality argument is that there is no developmental point at which a line can be drawn between expendable and non-expendable fetuses, that is, between non-personal and personal fetuses. It may be preferable to carry out abortions earlier rather than later during gestation, but that is a biomedical and not an ethical decision.

The fetus, throughout its development, is important. Its potential for personhood marks it off as an entity of significance and potential dignity. There is a gap of profound dimensions between an unborn baby and an appendix; the former has the potential to become a fully-developed, mature human being, whereas the latter under routine circumstances has not. Norman Geisler writes: "There is a vast difference between that which can develop into an Einstein or a Beethoven and an appendage of the human anatomy. The former has immortality in the image and likeness of God before it: the latter is merely an expendable tissue of a human body."[28] Or to phrase it rather differently, one cannot compare Beethoven's person and achievements with his appendix. From this it follows that elective abortion (abortion on request) cannot be used legitimately either as a form of birth control or as a routine way out of the consequences of irresponsible sexual activity. Once a fetus has been conceived, that fetus must be regarded with seriousness and concern. To dispose of it lightly is to demean humanity and God's purposes for that potential person. Under normal circumstances, a fetus has a right to full personhood, a right that is repeatedly refused it in today's society. To put it in another way, conception is a *prima facie* case in favour of giving the undeveloped person a chance to develop.[29]

For a Christian couple in particular, it behooves them to regard the fetus and all that it represents as a gift of God; they do not have the option of wondering whether the gift be accepted or rejected, even if the conception was unplanned. They have already entered the incalculably momentous role of being parents and ancestors, as C.S. Lewis[30] wrote and, as Rex Gardner expresses it: "Its potentialities are hers (the mother's) to protect and cherish, not to be

bartered for a color televison or a holiday on the Costa Brava."[31] Before rejecting a fetus, it has to be asked whether the decision is one that can be taken before God and in responsibility to him.

The fact that a mother does not want the fetus, for no better reason than that she does not want it, is not an ethically acceptable ground for abortion. The question is whether or not the fetus was *willed*, that is, whether or not sexual intercourse was freely undertaken. It it was, then as human beings we must accept the consequences of our actions. This is what human responsibility is all about. If, therefore, intercourse was freely undertaken by consenting parties, a fetus resulting from this intercourse has the right to live.[32] To abort on the grounds of convenience is to abrogate the responsibility bestowed on human beings by God.

Gordon Scorer has argued very persuasively, that to destroy life for reasons of convenience is to devalue it. Once it is decided that life is no longer uniquely precious, relationships in society become less important and may ultimately become meaningless. Scorer writes:

> . . .life has no existence and meaning apart from relationship with other lives. When we debate the rights and wrongs of induced abortion, we are debating a problem of human relationships much broader and more significant than that of a woman with an unwanted fetus. We are concerned with society's attitude to human life.[33]

Having stated this, however, it is necessary to concede that we do not place an absolute value on human life as, according to most moral codes including the biblical one, there are circumstances in which life may be taken or at least may not be unduly sustained. If this is the case, it is difficult to argue that the fetus has an unqualified right to protection. The fetus is an integral participant in the human endeavour, and must be viewed in the context of all the relationships of which it is a potential part.

We are left with a two-fold perspective: our view of the fetus should be a high one but it should not be an absolute one. The fetus, being weak and defenceless, should receive considerable protection, but that is not the same as guaranteeing absolute protection. Furthermore, even when absolute protection is guaranteed in theory, it cannot be sustained in practice. There is a continuity of life from conception to death, and so what we need is a moral formula applicable to fetal life as much as postnatal life. In other words, we must look seriously at extending the concept of justifiable homicide back to a concept of justifiable feticide.[34]

In the light of this discussion, we must now ask whether there are any circumstances in which abortion is permissible. The fetus cannot decide and so this is a responsibility which falls on others.

Grounds for abortion

Whatever grounds for abortion there may be, they are to be regarded as exceptions to the general rule of fetal protection. Only the most extreme of circumstances should provide grounds for abortion, which should only be undertaken in response to otherwise unresolvable dilemmas. Nevertheless, there are situations in which abortion is the regrettable, and perhaps undesirable, solution to human problems.

Danger to the physical health of the mother

There are instances where the physical health of the mother is placed in jeopardy by the continuance of a pregnancy, although this is undoubtedly a declining reason for termination. It is, however, sometimes a legitimate reason because, according to most commentators, an actual person is of greater intrinsic value than a potential person, that is, the mother's life is of more intrinsic value than that of the fetus she is carrying. In other words, the mother's actual humanity is of more value than the unborn's potential for it.[35]

Abortion in this instance is allowed by practically all ethicists, thereby converting all absolute stances into relative ones. This is the one exception to the rule of fetal inviolability that, in my opinion, is the downfall of fetal inviolability. An absolute anti-abortion stance cannot cope with direct conflict between maternal and fetal lives. Its ethical base is inappropriate, unlike that of the continuum-potentiality approach.

Danger to the mental health of the mother

The mental health of the mother is a more difficult realm; the use to which this is put as a reason for abortions in our society demonstrates the ease with which the public and medical profession are abusing the concept. Nevertheless, there may well be extreme instances where this must be seriously considered. These are extreme and always exceptions to the rule. By their very nature, they are compromises because one is doing something that is far from ideal. And yet, there are undoubtedly family situations where inadequacy, marital breakdown, financial stringency, unemployment and a host of other adverse social conditions lead to the conclusion that abortion of an unwanted pregnancy is the least tragic of a number of tragic options.

The difficulty with this ground for abortion is the vagueness of the concept of mental health, and the ease with which in practice it can be made to mean what society wants it to mean. All too easily, it is equated with abortion on request where termination occurs for reasons of personal convenience. Nevertheless, there undoubtedly are tragic situations in which life has already been so devalued and personal relationships have become largely meaningless that yet another child would aggravate the tragedy—for itself as much as for the mother. What is so badly needed in such situations is that the abortion is accompanied by a determined effort to rebuild personal relationships, and to inject some form of meaningful humanity into that home. The abortion itself can be justified only as part of a wider therapeutic endeavour, and after the possibility of adoption has been discounted. It is unfortunate that in societies where liberal abortion laws operate, adoption has become an unacceptable alternative to abortion on request.

Rape and incest

Rape raises the question of whether a woman should be forced to be a mother against her will, and this immediately raises the further issue of whether a woman should be allowed to be treated as anything other than a fully human person. In this instance, the confrontation is between the conflicting demands of the personhood of the woman and the right to be born of a child conceived in evil.

If conception has occurred without the consent of the woman, it would appear to follow that abortion is in order if the woman requests it. This is because a woman is more than just her body; she is a person created in the image of God. Rape, therefore, is a denial of her personhood and of what she *is* in the eyes of God.

A life generated by rape serves only to underline the manner in which the mother's rights to health and self-determination have been infringed. As such, the rights of an actual person, the mother, take precedence over the rights of a potential person, the fetus. As Norman Geisler has expressed it: "A potentially human person is not granted a birthright by violation of a fully human person unless her consent is subsequently given."[36]

Similar arguments apply to incest, where both rape and eugenic considerations are relevant. To quote Geisler again:

> Allowing an end to blossom in the name of a potential good (the embryo) seems to be a poor way of handling evil, especially when the potential good (the embryo) may itself turn out to be another form of evil. It is better to prevent the evil from coming to fruition than to perpetuate it.[37]

Genetic reasons

These now constitute one of the most serious reasons for therapeutic abortion, including as they do genetic and chromosomal abnormalities such as found in Down's syndrome, haemophilia, Tay-Sachs disease, disorders following maternal German measles and many other mental and physical defects.[38]

Ethical difficulties abound in the realm of genetic abortion, and the perplexities here are far greater than when considering abortion on other grounds. This is such a vast realm that in the present context my only intention is to introduce some of the major areas of debate.

Whose good is involved? Genetic abortion is carried out because, by preventing a genetically malformed baby from entering the world, it is of therapeutic benefit—but, to whom? Three answers are given to this question: it is to the good of the fetus, the parents or society.

Some genetic disorders are so severe that it is frequently argued abortion is for the good of the fetus. In other words, non-existence is a benefit to the fetus by preventing intolerable suffering, severe retardation or gross malformation. Would this be the case with Down's syndrome? Probably not, although it may be with much worse disorders such as Lesch-Nyhan syndrome with its concomitant mental retardation, compulsive self-mutilation and usually death in childhood.

Enormous care must be exercised in arguing this way, however, because it involves acting against abnormality and suffering by means of non-existence. A disease is cured, not by making the patient better, but by bringing the patient's existence to an end. Is it meaningful to argue in this way; can there be benefits without a beneficiary?[39]

Very easily the good of the fetus becomes the good of the parents. Aborting a malformed fetus may be a prelude to the hope of conceiving a healthy, replacement one later. Understandable as this is, it is a step on the road to the making of human persons interchangeable. Once this is accepted, the uniqueness and irreplaceability of humans will come to assume less significance than their health or lack of it.[40]

More generally, the care of a severely defective child can be an overwhelming financial and emotional burden on parents. It may well be that some families will be unable to cope, although predictions about this may be far from accurate in specific instances.

The good of society revolves, almost always, around financial issues. Cost-benefit analyses have been made of many genetic conditions, and the results invariably show that the medical expenditure on genetically abnormal children and adults far exceeds that of prenatal detection. No matter how valid these determinations, the assumption on which they are based is that normality is preferable to abnormality and should replace abnormality whenever possible. This assumption, if taken to extremes, questions the equality of all human beings and places the good of society above that of individuals.

The humanity of malformed humans. Genetically defective individuals are still human beings who, in many instances, have unmistakable marks of personhood. Indeed, sometimes very deformed children demonstrate human qualities in abundance. A deformity should be very major before an abortion is even considered, and it should somehow be demonstrated that the deformity is so great as to rob the fetus of any potentially personal qualities. After all, what is under discussion is the responsibility of one person to decide in advance for *another* person that this other person's future life will not be worth living. This is an onerous—perhaps an unreal—responsibility, which should not be lightly accepted.

The good of all who might be directly involved in the birth of a severely deformed child needs to be considered. In making the decision, a balance needs to be attained between the pursuit of biological quality and the potential that a deformed child within a family holds out for that family to be humanized and to grow as a loving, human unit. Unfortunately, some families cannot cope with such a challenge, and a compromise must be reluctantly adopted, namely, termination of the pregnancy. Christians must never acquiesce too easily in the replacement of a tradition of mutual care by a tradition of disposal.[41]

Allied with this is God's love for the weak and fragile. This requires that we show a comparable concern for the

abnormal and those likely to be rejected by society.[42] Fetuses are not merely physico-chemical mechanisms to be eliminated at will, even though the intentions are good. They are to be viewed with concern because they are human and because all members of the human community are genetically imperfect. Genetic perfection is an unattainable ideal, and our actions in readily eliminating genetically defective fetuses are not to be guided by such an ideal.

Ours is a fallen world, and the genetically defective are one manifestation of that fallenness. However we cope with the genetically defective, therefore, it is to reflect concern for the weak and defenceless, whether these be fetuses, distraught parents, or even a bewildered society. In general, helping the handicapped, not taking their life in advance, is the way to improve the quality of human life.[43]

People and diseases. Throughout discussions on genetic abnormality care needs to be taken in maintaining the distinction between the person and the disease. Otherwise, the conclusion is reached that the afflicted person or fetus *is*, rather than has, a disease.[44] It is easy to slide from the language of possession to that of identity, so that "he has haemophilia" becomes "he is a haemophiliac". When this transition occurs, the impression is given that the goal of abortion is the elimination of persons rather than the treatment of diseases.

This lack of distinction between people and their disease is highlighted by the dilemma frequently encountered when contemplating genetic abortion. This is the statistical risk of defect, so that when abortion for a statistical risk is carried out more healthy fetuses than deformed ones will be killed. This equation confronts us with the ethics of destroying normal fetuses as opposed to the ethics of allowing into the world defective fetuses. Which then matters—the fetus or the disease?

Last words. It is impossible to emerge with any concise conclusions regarding genetic abortion. The issues are too complex and unresolved at present. Two quotations may highlight the difficulties.

> One doctor to another—"About the terminating of a pregnancy, I want your opinion. The father was a syphilitic. The mother tuberculous. Of the four children born the first was blind, the second died, the third was deaf and dumb, the fourth also tuberculous. What would you have done?" "I would have ended the pregnancy." "Then you would have murdered Beethoven."[45]

> I was conceived after antibiotics yet before amniocentesis, late enough to have benefited from medicine's ability to prevent and control fatal infectious diseases, yet early enough to have escaped from medicine's ability to prevent me from living to suffer from my genetic diseases. To be sure, my genetic vices are, as far as I know them, rather modest, taken individually—myopia, asthma and other allergies, bilateral forefoot adduction, bowleggedness, loquaciousness, and pessimism, plus some four to eight as yet undiagnosed recessive lethal genes in the heterozygous condition—but, taken together, and if diagnosable prenatally, I might never have made it.[46]

Conclusion

Whatever directions our thinking on abortion may take, we must beware of becoming censorious. If our approach to the issue and to individuals involved in making decisions is to be a truly human approach, and by that I mean a Christ-like approach, it must be characterized by *compassion*. Any decision to proceed with an abortion should be an agonizing one—anything less than that shows little regard for either the fetus or mother. There may be situations where women seek abortions on what Christians consider inadequate grounds; if that is so, our attitude should be a compassionate one in which we seek to help them not merely over the immediate problem but in the long term as well. They, too, are human beings, in need of all that is truly human.

REFERENCES

[1]Tanner, J.M., *Foetus into Man: Physical Growth from Conception to Maturity* (Open Books, London 1978), pp. 37, 38.

[2]Moore, K.L., *Before We Are Born* (W.B. Saunders, Philadelphia 1977), pp. 51-55.

[3]Langerak, E.A., Abortion. Listening to the Middle, *Hastings Center Report, 9,* 24-28 (1979).

[4]Langerak, *op cit.*

[5]*Idem*

[6]Fletcher, J., *Morals and Medicine* (Beacon Press, Boston 1960), p. 150.

[7]Fletcher, J., *Humanhood: Essays in Biomedical Ethics* (Prometheus Books, Buffalo 1979), p. 135.

[8]*Ibid*, p. 138.

[9]*Ibid*, p. 144.

[10]*Ibid*, p. 146.

[11]Bieler, L. (editor), *The Irish Penitentials* (Scriptores Latini Hiberniae, Dublin 1963), p. 229.

[12]Abbo, J.A. and Hannan, J.D., *The Sacred Canons* (B. Herder Book Co., St. Louis 1952), vol. 1, pp. 752-753.

[13]Smith, H.L., *Ethics and the New Medicine* (Abingdon, Nashville 1970), p. 34.

[14]Ramsey, P., The sanctity of life, *The Dublin Review 241,* 3-23 (1967).

[15]Ramsey, P., Reference points in deciding about abortion. In J.T. Noonan (ed.), *The Morality of Abortion* (Harvard University Press, Cambridge, Mass. 1970), pp. 69-79.

[16]Ramsey, P., Abortion: a review article, *The Thomist 37,* 174-226 (1973). Reprinted in *Three on Abortion* (Child and Family, Oak Park, Illinois 1978).

[17]Smith, *op cit.*, p. 44.

[18]Thielicke, H., *The Ethics of Sex* (James Clarke and Co., Cambridge 1964), p. 231.

[19]*Ibid*, p. 227.

[20]*Ibid*, p. 228.

[21]*Ibid*, p. 243.

[22]Harris, B., *Abortion* (Evangelical Movement of Wales, no date), p. 12.

[23]Waltke, B.K., Old Testament texts bearing on the problem of the control of human reproduction. In W.O. Spitzer and C.L. Saylor (eds.), *Birth Control and the Christian* (Tyndale House Publishers, Wheaton 1969), pp. 7-23.

[24]*Idem.*

[25]Smith, *op cit.*, p. 51.

[26]*Ibid*, p. 53.

[27]Dunstan, G.R., *The Artifice of Ethics* (SCM, London 1974), p. 70.

[28]Geisler, N.L., *Ethics: Alternatives and Issues* (Zondervan, Grand Rapids 1971), p. 219.

[29]*Ibid*, p. 220.

[30]Lewis, C.S., *The Four Loves* (Bles, London 1960).

[31]Gardner, R.F.R., *Abortion: The Personal Dilemma* (Paternoster Press), Exeter 1972), p. 127.

[32]Geisler, *op cit.*, p. 224.

[33]Scorer, C.G., *Life in our Hands* (IVP, London 1978), pp. 129, 130.

[34]Dunstan, *op cit.*, p. 82.

[35]Geisler, *op cit.*, p. 221.

[36]Geisler, ibid, pp. 222, 223.
[37]*Ibid*, p. 223.
[38]Jones, D.G., *Genetic Engineering* (Grove Books, Bramcote, Notts. 1978), pp. 4-7.
[39]Camenisch, P.F., Abortion: for the fetus's own sake? *Hastings Center Report 6*, 38-41 (1976).
[40]*Ibid.*
[41]Dunstan, *op cit.*, p. 85.
[42]Shinn, R.L., Foetal diagnosis and selective abortion: an ethical exploration. In C. Birch and P. Abrecht (eds.), *Genetics and the Quality of Life* (Pergamon Press, Potts Points, N.S.W. 1975), pp. 74-85.
[43]Geisler, *op cit.*, p. 227.
[44]Kass, L.R., Implications of prenatal diagnosis for the human right to life. In J.M. and R.F. Almeder (eds.), *Biomedical Ethics and the Law* (Plenum Press, New York 1976), pp. 313-327.
[45]St. John-Stevas, N., *The Right to Life* (Hodder and Stoughton, London 1963), p. 20.
[46]Kass, *op cit.*, p. 313.

The Reasonableness of Metaphysical Evidence

ROBERT A. HERRMANN

Mathematics Department
U.S. Naval Academy
Annapolis, Maryland 21402

This article explains how a recent discovery in the science of mathematical logic has been employed to construct a scientific model for many of the major concepts in Christian doctrine. These results give strong scientific evidence that the basic foundation for the religious philosophy of Marxists, secular humanists, atheists and millions of individuals who reject Christianity is logically incorrect. The logical incorrectness of this foundation is grounded on the fact that it has been scientifcally established that this foundation is based upon a mathematically refutable premise.

Christian Evidence

There exists a considerable amount of personal, experiential, behavioristic, historical, linguistic, statistical and purely scientific evidence which may empirically establish that the major concepts of Christianity are true. One of my major concerns is why the scientific, political and philosophical communities, as well as millions of ordinary everyday individuals, do not accept this evidence. Why is such evidence ridiculed or dismissed in secular arguments? What are the basic or underlying principles that have led many well known theological authorities to reject important portions of this evidence?

For an immediate answer to these perplexing questions, I present the official policies of the Soviet Union with respect to the religious beliefs which every Marxist must follow—at all costs. The Moscow Institute of Marxism and Leninism published in the 1960's the official Marxist view:

> Christianity, . . ., cannot agree with reason because 'worldly' and 'religious' reason contradict each other.[1]

Indeed, they even go so far as to define *metaphysics* as an "anti-dialectic method in thought. . . ."[2] where "anti-dialectic" at least signifies "not classically logical." Marx couples this unverified pronouncement with the absolute

statement that "Reality is rational," and concludes that supernatural metaphysical concepts cannot exist in reality since they are contradictory. Thus throughout the Marxist view of religion such terms as "fantastic," "imaginary" or "unreal" are continually employed to reinforce this belief and coerce the individual into its acceptance.

Even though Marx and Engels apparently considered the above description of metaphysical concepts as irrefutable, they did skillfully employ Christian evidence in their secular arguments. Engels writes,

> All religion, however, is nothing but the fantastic reflection in men's minds of those external forces which control their daily life, a reflection in which terrestrial forces assume the form of supernatural forces.[3]

Marx, Engels and many others use appropriate portions of Christian metaphysical evidence in an apparently logical argument, but interpret this vast amount of information completely in terms of secular possibilities—terrestrial forces—such as economic, social and humanistic forces. Any evidence that cannot be secularly interpreted is rejected as "fantasy," "observer error," or "insanity," or is simply completely ignored. By these methods a metaphysical alternative is logically rejected and thus totally avoided. Indeed, by rejecting the metaphysical alternative but using as much as possible of the available religious evidence interpreted in this secular manner, these philosophers are able to greatly enhance their secular viewpoint since such a vast amount of evidence exists. Not only do Marxists adhere to these accepted but unfounded beliefs, but most if not all modern humanists accept that at least a portion of the supernatural Christian doctrine as well as other complex religious concepts are not logically possible.[4] *Hence part of the foundation for these secular philosophies is an unshakable belief that one cannot logically argue for various supernatural concepts since these concepts are logically contradictory.*

In this article, I attempt to explain how a recent discovery in the science of mathematical logic has yielded a strong and clear result that the above foundation for the rejection of the supernatural alternative is logically incorrect. This article is the first announcement to the Christian and scientific communities of these interesting scientific discoveries.[5] I attempt this explanation in a straightforward, direct and simplified manner, without employing technical terms peculiar to the science of mathematical logic.

Classical Deduction and Philosophical Arguments

Throughout this article the terms "logic," "reasoning," "rational" and the like will be repeatedly used. What do these terms signify? Unless otherwise stated these terms always refer to the ordinary common everyday human procedure used by our brains to process information and infer or deduce other information, consequences or other similar results. Each of us applies this process thousands of times daily. Eminent scholars, scientists, authors, jurists, philosophers, theologians and educators use this process in their deepest deliberations—the same process you and I use to determine when to put on a pair of gloves. Let us intuitively refer to this process as *classical deduction or reasoning*. Now I don't mean to say that other forms of reasoning are not employed by humanity since they are in special circumstances. However, in this article only the classical thought processes of humanity are usually considered.

Prior to analyzing a logical procedure, the language used must be as nonambiguous as possible. In order to accomplish this the language should be constructed by following a rigorous set of rules for combining the various words taken from some fixed dictionary. The words are put together in a simple ordinary manner, in a non-picturesque way, indeed in a dull and boring manner that would never yield a passing grade in a creative writing class. This language intuitively is the same type of language the scientist uses to discuss concepts using his own special technical dictionary. It is the language that the mathematician uses to state theorems and prove their correctness. Now the actual construction of such a language need not concern us here; it is enough to say that this construction is easily accomplished.[6]

Consider a large computer that I term a *logic computer* and that is programmed to use classical deduction and yield a logical argument. Along with this logic computer consider four ordinary sentences from our simple language. These sentences are "Mary is short," "John is tall," "If John is tall, then it is not the case that Mary is short," and "John is tall if and only if Mary is short." Call these four sentences our *assumptions* or *hypotheses*. Insert these four statements into the slot marked "input" on the logic computer. Now turn on the power—the reasoning power—and process these assumptions. Slowly hundreds of sentences stream forth from the "output" slot of the logic computer. Let the computer operate for a while and then turn off the power and inspect the outputted statements. During this inspection you discover a peculiar occurrence. One of the statements reads, "Your cat is dead." Another statement reads, "It is not the case that your cat is dead." You continue to inspect other statements from the output slot and one of these statements reads, "It is not the case that John is tall." What has happened to your logic computer? How could you insert a sentence "John is tall" and the computer produce the sentence that "It is not the case that John is tall"?

Well, believe it or not the logic computer has not broken down, it is processing the information correctly. These strange deductive results are produced by logically combining the sentences you have inserted; they are not produced by some internal computer error. The computer is *not illogical*. If you leave the four sentences in the logic computer and kept the power on, then the computer is capable of producing every simple declarative sentence in the language and the negation of that sentence, among many other types, until it completely runs out of statements. In other words, the computer can deduce "everything" that you are allowed to write in sentences in your language if it runs long enough. Such deduction is said to be *worthless* since it does not differentiate between sentences. The computer simply reproduces your entire language of discourse

and nothing special. Technically when a logic computer produces a sentence and its negation, we say that it has produced a *contradition*. All that a computer needs to do is to produce one such contradiction, for one such contradiction in its processing procedure will automatically force the computer to start producing your entire language. Now remember that the computer is not to blame. You should blame the inserted assumptions for the difficulties that the computer is experiencing.

When a logic computer produces a contradiction, one should not say that the computer is "stupid" or something of this nature. Let us be more benevolent in our use of terminology. When the set of assumptions used produces a contradiction, simply indicate this by saying that they are *inconsistent*. Thus the production of a contradiction and an inconsistent set of assumptions are equivalent concepts. *From this viewpoint a set of assumptions is consistent if and only if the logic computer will never produce a contradiction, if and only if the logic computer will never produce your entire language of discourse.*

Traditionally the descriptive sciences and such areas as philosophy and theology have been able to use only the logic computer as their major source of reasoning power, with one of two minor exceptions.[7] Assume that you have a large amount of personal, experiential, behavioristic, historical, linguistic and other types of evidence and that you wish to argue for a certain philosophy or a special theology. The logical rules for your argument must come first or as Hartshorne writes,

> Logic is a priori because it analyzes knowledge apart from the knowledge. . . .[8]

The absolute and common requirement for rational thought by the philosopher and scientist is well documented. Any statement concerning scientific deduction should hold true for a philosophical argument as well, since a vast amount of scientific evidence is often employed to empirically verify philosophical beliefs.

> There is something (a basic rationality of the human mind and the universe) that we assume and operate with continually in ordinary experience and in science. . . . If the nature of things were not somehow inherently rational they would remain incomprehensible and opaque and indeed we would not be able to emerge into the light of rationality.[9]

W. Jim Neidhardt expresses these concepts in the following manner.

> Anyone who does science assumes that reality is intelligible, all experience possesses an intrinsic rational structure which can be grasped by a human mind governed by similar types of rationality.[10]

The quantum physicist Louis deBroglie writes,

> . . .the structure of the material Universe has something in common with the laws that govern the working of the human mind.[11]

C.S. Lewis makes the following observations,

> . . .that events in the remotest parts of space appear to obey the laws of rational thought. . .There is in our human minds something that bears a faint resemblance to it.[12]
>
> According to it what is behind the universe is more like a mind than it is any thing else we know.[13]
>
> What appears to be my thinking is only God's thinking through me.[14]
>
> He lends us a little of His reasoning powers.[15]

From this point on let us call the statement that "Reality is rational and consistent" the Axiom of Natural Consistency. Hence a philosophical explanation for any evidence first requires that a consistent set of assumptions be inserted into the logic computer. After you have convinced yourself that the basic statements required to argue for your philosophical concepts are *probably* consistent, then and only then should the evidence be applied in order to empirically determine whether or not your assumptions and logical results are probably *true in reality*, where "true in reality" may be interpreted by the phrase "an accurate description of reality" or some similar statement. In this case you have empirically "explained" the evidence—logically—by application of the Axiom of Natural Consistency. If there are different sets of consistent statements to which the evidence may apply, then you also need a great deal of faith that the evidence is true in reality and truly fits into your statements in a manner that is better than the way it fits into these other statements. Moreover, it is important that the logical results you obtain give the best fit to the past, present and future evidence. Consequently you need a great deal of faith—faith in your evidence, faith in the consistency of your argument and faith that your philosophy fits the evidence best. For these reasons it's very important to realize that your argument becomes more convincing if you are able to *logically reject* any other alternative explanation. Since we are always assuming that an argument

Robert A. Herrmann is Associate Professor of Mathematics in charge of all the mathematical logic courses at the U.S. Naval Academy, Annapolis, Maryland. He holds a B.A. in Mathematics from the Johns Hopkins University, and an M.A. and Ph. D. in Abstract Mathematics from The American University. He is an elected member of honor societies Phi Beta Kappa (for undergraduate studies), Phi Kappa Phi (for graduate studies) and Sigma Xi (for research). Since 1975 Professor Herrmann has published more than thirty-five research articles in national and international journals, presented more than twenty research papers before scholarly societies and has written more than forty-five reports and reviews in the areas of mathematical logic, nonstandard analysis, model theory, applied mathematics and general topology. He is a reviewer for Mathematical Reviews, *a journal referee, an adviser to the U.S. Congress, director of The Institute for Mathematical Philosophy, a member of the American Mathematical Society, the Mathematical Association of America and the American Scientific Affiliation.*

is obtained through the proper application of deductive reasoning, then the logical rejection of an alternative philosophy could be based upon the concept of an inconsistent hypothesis. As previously mentioned this is exactly the method which has been employed to reject a supernatural Christian alternative.

At this point, let us be more specific as to this rejected alternative. Consider the following hypothesis which I call the *secular hypothesis* or simply *SH*.

> It is impossible to express in a non-contradictory (i.e. logically consistent) manner the concepts of humanity, human laws of behavior, natural laws, natural laws of behavior, the Supernaturals, the Deity, the Christian concept of the God-man, the New Nature, the Trinity, miracles, Divine reasoning, the perfect human being, unholy supernatural concepts, supernatural good, supernatural evil and other Christian supernatural concepts.

As previously mentioned, many eminent scholars accept portions—if not all—of the secular hypothesis whenever some supernatural concept is included. It also appears from their popular expositions that all the modern humanists accept the SH—or major portions thereof—since they all appear to ascribe to classical philosophical statements such as those written by Santayana:

> . . .the grand contradiction is the idea that the same God who is the ideal of human aspiration is also the creator of the universe and the only primary substance.[16]

These influential individuals have led millions of human beings into an adherence to portions of the secular hypothesis. Indeed, in recent articles in *Christianity Today*[17] the vast influence of these individual SH believers is stressed and analyzed.

There are specialized techniques that can explain some of the evidence with a very weak theism. Hartshorne[18] indicates how this is accomplished when he argues for the acceptance of panpsychism. These procedures seem unable to explain any complex metaphysical concept. Also there are special dialectical methods that may be employed to give a mild supernatural explanation for some Christian evidence. These methods have been skillfully employed by such theologians as Karl Barth and Dietrich Bonhoeffer. These special dialectics do not entirely use the classical logic computer and for this reason their arguments are essentially weaker.

Scientific Models

We now approach consistency from an equivalent but apparently considerably different procedure. This viewpoint is technically called the *mathematical structure* or *model* concept. It's interesting to note that the formal equivalence of these apparently two diverse concepts— formal logic computers and models—was not established until the 1930's.[19]

In place of the logic computer, consider a large collection of machines that are called *mathematical structures*. Consider once again a set of assumptions, but this time each assumption carries a tag on which is written a big *T*. An intuitive or technical definition for the *T* symbol need not concern us in this discussion. It is enough to say that the *T*'s mathematically mirror the behavior associated with classically combining "true" statements. Now you begin a search through your structures. A search for what? Well, you search for a structure machine that will accept your assumptions. You ask, "What does a structure do in order to determine acceptance?" First, you insert your assumptions into the input slot of a particular structure machine. The machine immediately translates your assumptions, if possible, into its internal language. Following this, the machine compares your translated assumptions with its own internal set of statements. Each of your translated assumptions must match a corresponding statement inside the structure machine. Moreover, you can assume that each statement in the structure carries a tag with a *T* written on it. If any of your assumptions does not correspond to an internal machine statement, then and only then does the machine reject your entire set of assumptions and you are forced to search for another structure. *Thus your assumptions must be translatable into the language of the structure and they must correspond to machine statements before the machine will accept them.*

Assume that you have located a structure which has accepted your assumptions. Immediately a sign goes up on the structure which reads MODEL. The structure has become a *model for your assumptions* and the correspondence between your assumptions and the internal machine language is often called a *satisfied interpretation*. At this point you turn on the power to your model. Soon some statements that have been translated back into your language drop from the output slot of your model. After some time has passed you begin your inspection of these outputted sentences. You are delighted to see that all of the outputted statements carry a tag on which the one symbol *T* appears. Moreover, if you compare all of the outputted statements, you discover that there are no contradictions and that no contradictions ever occur. These highly significant results are implied by the fact that *your assumptions have a model if and only if they are consistent*. I should mention that these last three statements are based upon the hypotheses used by the mathematician in the construction of these mathematical structures. Furthermore, philosophically the most important property a set of assumptions can possess is consistency.

Are the structures effective predicters of consistency? In general, the answer is yes since there is no acceptable procedure nor any logic computer approach that will determine absolute consistency except for finite collections of relatively simple statements. This is the basic reason why philosophers must assume their assumptions are consistent when they apply the logic computer technique. On the other hand, I don't wish to mislead you at this critical point. For most collections of assumptions, acceptable models based only on these assumptions may be difficult to locate. For an excellent discussion on how the scientist locates the appropriate structure I suggest the paper by W. Jim Neidhardt.[22]

Of course, the structures themselves must have come from some place and they need some rules for their construction by the mathematician. What is there that assures

us that these rules of construction are consistent? This is a very deep question in the foundations of mathematics. Some of the greatest mental giants in recorded history have worked on this problem, and there is strong evidence both philosophical and mathematical that the rules used for these modern constructions are consistent. This is the reason why users of these structures do not concern themselves with the consistency problem. They assume that consistency is already built into the model they are using. Timothy Ferris writes,

> Scientific theories must be logical. They must be expressible in terms of mathematics, the most rigorous logical system known.[21]

The faith that an investigator has in a mathematical model depends strongly upon the *predictability* of the model. After a set of statements has been accepted by a structure machine, the machine often produces or is forced to produce a number of new results relating the various terms and symbols which appear in these sentences. Many of these results may seem to have no immediate application to the real world problem being studied. However, some of the more pertinent results may lend themselves to experimental testing. Assume that an investigator devises such an experiment. If this experiment approximately agrees with one of these new statements, then the model has "predicted" something which was not previously known. A model need not predict anything; or if it predicts, it need not go on predicting. Indeed, a model may even predict totally incorrect real world events. Finally a model may predict interesting results that cannot be tested using present laboratory abilities.

One important and often hidden fact relative to mathematical models is that the explanation given by a scientist's model in no way explains the phenomenon from a real world viewpoint. It is only a large number of symbols and terms written on hundreds of pages of paper and one should make no other assumptions.

> All were human inventions and none should be confused with the phenomena they sought to explain. . .Our theories are not 'laws' that nature 'obeys.' They imitate. . .[22]

When all is said and done the major contribution of the mathematical structure lies in its ability to yield what is evidently[23] non-contradictory results or predictions. Coupling this with the Axiom of Natural Consistency simply increases one's faith in the absolute consistency of a structure. All structures used by modern science have compiled a vast amount of empirical evidence that certainly implies that the structures are highly consistent. These structures yield apparent contradictions only when they are not carefully employed, or when the investigator has poor knowledge of the structure's mathematical content.

The Grundlegend Structure (G-Structure)

A mathematical structure has been constructed which gives strong evidence that the secular hypothesis is logically incorrect. This structure was created by use of a recent advance in mathematical logic—the *nonstandard analysis* of human deductive processes. The basic tool used for this

A recent discovery in the science of mathematical logic has yielded a strong and clear result that the foundation for the rejection of the supernatural alternative is logically incorrect.

construction was not even discovered until 1967.[24] Indeed, it has been shown using this scientifically acceptable structure that there is a model (the G-model) for many of the most important Christian concepts.[25] More specifically it logically models all of those terms which are expressed in the body of the secular hypothesis, among others, in an evidently consistent and non-contradictory manner. Moreover, the G-structure uses as a foundation the most empirically consistent mathematical structure which is available to science—the modern elementary theory of sets.

The philosophical basis for this mathematical model is the descriptions of these concepts as expressed in the writings of C.S. Lewis. [26] C.S. Lewis never doubted that he was giving a logically consistent argument for the acceptance of Christianity. His genius at simplifying vague theological concepts and presenting this metaphysical alternative to those philosophies expounded by the SH believers is the major reason why it is possible to construct an acceptable mathematical model for much Christian doctrine. The mathematical statements accepted by this structure are highly similar to the philosophical thoughts of Lewis. Moreover, this scientific model is highly predictive and has application to various diverse areas of descriptive science and even other metaphysical beliefs.

The entire body of *The G-Model (Applied to C.S. Lewis)*[27] is an attempt to show—simply and intuitively—how this model logically yields Lewis' theological descriptions by giving the reader the mathematically predicted statements but translated back into Lewis' theological language. Indeed, the mathematical constructions and propositions appear only in the appendix.

Consequently the philosophies based upon the acceptance of the supernatural portions of the secular hypothesis—those philosophies which reject as contradictory various important supernatural Christian doctrines—are based upon a mathematically refutable premise and are evidently inconsistent. This implies that the huge amount of evidence for a supernatural alternative—a Christian alternative—should not be *rejected* on this logical ground, as many individuals continue to do.

C.S. Lewis, after a great amount of contemplation, had great faith that Christianity is true in reality, where this "faith" concept is termed by Lewis as faith in the first or beginning level sense. However, his acceptance of this truth was not easy. He called this his "rational conversion." He means by this,

From a purely abstract and unemotional viewpoint, it can be minimally stated that Christianity is as "real" as all scientific theories based upon mathematical models.

> . . .that though the spirit of man 'must become humble and trustful like a child and, like a child, *simple in motive,*' Christ did not mean that the 'processes of thought by which people become Christians must be a childish process. At any rate.' he went on to say, 'the *intellectual* side of my conversion was *not* simple. . . .'[28]

Evidence for many of the major doctrines of Christianity can now be interpreted in a scientific model which "explains" this evidence in a logically acceptable manner. Furthermore, under the usual applied model-theory premises, the logical incorrectness of the secular hypothesis implies that any philosophical system based upon such a secular hypothesis cannot be consistent and, therefore, must be rejected.

Examples

Due to space limitations I am unable to give many specific examples of exactly how the G-structure is capable of modeling the theological thoughts of Lewis. The simple and intuitive modeling process requires approximately 160 manuscript pages in order to establish a correspondence between Lewis' concepts and the translated model statements. The rigorous mathematical appendix yields an additional 60 manuscript pages of abstract mathematical constructions and rigorously established propositions. Moreover, I am unable to present the detailed geometric interpretations in this article due to the number of definitions required. However, I have selected a representative collection of translated sentences which might give you some idea of how the modeling procedure functions.

(1) There exists a Divine reasoning process $*P$ which has the following properties. When $*P$ is applied to sentences that are understandable by humanity then $*P$ is the same reasoning process as is used by the logic computer. The process $*P$ can be applied to sentences that are not understandable by humanity and, in this case, the process can yield sentences and results which are understandable by humanity and sentences and results which are not understandable by humanity. The Divine reasoning process $*P$ is more powerful than the logic computer process. The rules which explain how the Divine process $*P$ functions are not understandable by humanity. The Divine reasoning process $*P$ is not the same as any human reasoning process.

(2) There is a Divine reasoning process $*F$ which presses on us and urges us on to decent moral behavior.

(3) There are Supernatural objects which describe a moral behavior that is better than any list of moral traits taken from Lewis' Law of Decent Moral Behavior.

(4) If your personal law of moral beliefs is contained in Lewis' Law of Decent Moral Behavior, then your personal law of moral beliefs is contained in the law of perfect moral behavior and in the Divine law of perfect moral behavior.

(5) There is a Divine force $*F'$ and a Divine object such that when this Divine force is applied to this Divine object the result is the New Nature (i.e., the New Creation).

(6) Many properties of the supernatural levels are subconsciously perceptible.

(7) The Divine force $*F'$ applied to an angelic object yields a complete supernatural object.

(8) (T_1) From the Divine viewpoint, the Father, the Son and the Holy Spirit are distinctly different Divine objects. (T_2) From the viewpoint of the Christian worshipper, the Father, the Son, and the Holy Spirit are terms which in the spiritual world describe the same objects. There are numerous other properties. (Of course, it is consistent to use T_1 only or T_2 only or T_1 and T_2 together.)

Faith and Applications

A Christian is required to have "faith" in his supernatural beliefs and this "faith" must at least be "faith in the first sense."[29] How does faith enter into these new and useful results? Nothing which has thus far been written in this article requires that the statements used in a logical argument for Christianity be true in reality. I have stressed the fact that evidence can be used to argue for many different and totally divergent philosophies or theological beliefs. Now that there is evidently a rational scientific model for Christianity, then in order to apply the evidence in a meaningful way to this model you must have great faith that the evidence is true in reality and not some fantastic imagination or dream. You must have faith that the Christian model is the correct model that logically explains this evidence. Now this faith is exactly the same type of faith that the secularist requires. Those accepting some secular model for the evidence must have faith that their model is a correct model which logically explains the evidence. In either case, each individual must still make a choice necessarily based upon faith. I am not discussing the methods that an individual might employ, other than rational thought processes, in order to obtain such a faith.

One of the important aspects of these new results is that they give to each individual a *rational choice* of a rational scientific model to explain the evidence. For many years we have been incorrectly told that there did not exist a rational supernatural choice. Such a supernatural Christian choice now exists. The amount of evidence that you believe is true in reality, if it fits into this Christian model more readily than any other known model, gives you a definite empirical measure that the entire body of predictions obtained from such a model will also be true in reality. But, you must have faith that the evidence is true in reality and that the Christian model is the one into which the evidence—the majority of the evidence—fits most easily.

Can you personally use the translated statements and geometric interpretations generated by this structure in any

reasonable manner? Because of the mathematical methods employed you could use your everyday reasoning powers along with these results and obtain some new, interesting and often startling conclusions—conclusions which are highly consistent and not worthless. You could easily come to the conclusion that there is considerable abstract and unbiased evidence that Christianity is at least mathematically possible. The mathematically trained individual might even produce many results by purely abstract procedures.

More importantly, I have been asked to give various examples of how Christians could directly employ the Grundlegend model (the G-model) in apologetics. For Christians the most important aspect of this research is that it gives strong scientific evidence that Christian doctrine is not contradictory as has been so widely assumed. This is a major defense of Christianity and tends to destroy much competitive philosophy. These results also neutralize most of the secular scientism of the last century or so. Of course, these findings could be the final piece of evidence which would lead an individual to accept Christianity as a personal philosophy. The predicted results from this model tend to yield a much clearer, concrete and specific image of what has often been confusing and nebulous Christian doctrine. The use of this scientific model in Christian education is obvious. It is also clear that for a Christian of weakening faith these results could provide an important faith builder. Even though I have not been able to analyze the entire body of important Christian doctrine, I firmly believe that this approach will eventually establish the consistency of all major Christian concepts. With this in mind, from a purely abstract and unemotional viewpoint, it can be minimally stated that Christianity is as "real" as all scientific theories based upon mathematical models. This includes almost all of modern science. Thus there is no logical reason that Christian doctrine should not be taught and studied, at least on the same technical level as any mathematically based scientific theory, in *every* public and private school, college and university. Moreover, the apparent existence of a rational model for the supernatural tends to suggest that some new evidence for the truth of Christian doctrine could be obtained from the various experimental techniques employed by the behavioral scientists, in particular, experiments in subliminal perception as well as statistically significant results based upon experiential evidence. As to the relevance of the Scriptures for our modern society, it now follows that you can use your everyday human reasoning power, with little fear that it will be worthless, to logically obtain scripturally directed solutions to the complex problems of our modern society. Finally, these results bring new and profound meaning to what God said to Isaiah:

"Come now, and let us reason together."

REFERENCES

[1]K. Marx and F. Engles, *On Religion*, Translated by the Institute of Marxism-Leninism of the C.C., C.P.S.U., Foreign Languages Publishing House, Moscow (1960), p. 24.

[2]*Ibid.*, p. 351.

[3]*Ibid.*, p. 147.

[4]Paul Kurtz, (ed.), *The Humanist Alternative; some definitions of Humanism*, Prometheus Books, Buffalo, New York, (1973).

[5]As is explained in the section on Examples these discoveries are intuitively and rigorously discussed in the manuscript *The G-Model (Applied to C.S. Lewis)*, distributed at cost by I.M.P. Press, P.O. Box 3410, Annapolis, MD 21403 USA.

[6]S.C. Kleene, *Mathematical Logic*, John Wiley & Sons, Inc., New York, (1967).

[7]Charles Hartshorne, *Beyond Humanism*, University of Nabraska Press, Lincoln, Nabraska, (1937), p. 273.

[8]*Ibid.*, p. 262

[9]Thomas F. Torrance, *Theological Science*, Oxford University Press, Oxford, (1969), pp. vi-vii.

[10]W. Jim Neidhardt, "Schematic Portrayals of the Personal Component in Scientific Discovery", *Journal ASA* 32(1) (1980), p. 62.

[11]Arthur March and Ira M. Freeman, *The New World of Physics*, Vintage Books, New York, (1963), p. 143.

[12]C. S. Lewis, *Miracles*, Macmillan Paperbacks, New York (1978), p. 32.

[13]C. S. Lewis, *Mere Christianity*, Macmillan Paperbacks, New York, (1960), p. 32.

[14]C. S. Lewis, *Miracles*, Macmillan Paperbacks, New York (1978), p. 29.

[15]C. S. Lewis, *Mere Christianity*, Macmillan Paperbacks, New York, (1960), p. 60.

[16]George Santayana, *Reason in Religion*, Charles Scribner's Sons, New York, (1905), p. 159.

[17]Bruce Demarest, "Six Modern Christologies: Doing Away With the God-Man," *Christianity Today*, 23(14)(April 20, 1979), pp. 783-787; Cornerstone, "The Mythmaker's Myth," *Christianity Today*, 23(27)(Dec. 7. 1979), pp. 1624-1625; Editorial, "Did Christianity Corrupt Lewis?" *Christianity Today*, 23(28)(Dec. 21, 1979), p. 1663.

[18]Hartshorne, *Op. Cit.*

[19]K. Gödel, "Die Vollständigkeit der Axiome des logischen Funktionenkalküls," *Monatch. Math. Phys.*, 37(1930), pp. 349-360.

[20]Neidhardt, *Op. Cit.*

[21]Timothy Ferris, *The Red Limit*, Bantam Books, New York, (1979), p. 157.

[22]*Ibid.*, p. 152.

[23]The term "evidently" or the like is used here since this consistency is based upon the concept of the mathematical (i.e., scientific) model. This popular term replaces the technical term "semantical". Semantical consistency, since it is based upon a set-theoretically constructed model, may be considered somewhat weaker than absolute (i.e., syntactical) consistency. However, semantical consistency is as strong as the model consistency associated with the most widely accepted scientific models. More importantly, semantical consistency is a stronger and more reliable form of consistency than usually employed in a complex philosophical argument since in such arguments the absolute consistency of the premises is simply *assumed* by applying experiential evidence and the Axiom of Natural Consistency. It is a well known fact that absolute consistency cannot, in general, be determined solely by use of the logic computer. The determination of absolute consistency requires acceptable methods which are exterior to the logic computer. Such consistency can be determined only for collections of relatively simple statements. For complex collections of premises semantical consistency is the strongest and most widely recognized consistency which is mathematically available.

[24]A. Robinson and E. Zakon, "A Set-Theoretical Characterization of Enlargements," in *Applications of Model Theory to Algebra, Analysis and Probability*, (ed.), W.A.J. Luxemburg, Holt Rinehart and Winston, New York, (1969), pp. 109-122.

[25]Robert A. Herrmann, *The G-Model (Applied to C.S. Lewis)*, I.M.P. Press, P.O. Box 3410, Annapolis, MD 21403, USA.

[26]C.S. Lewis, *Op. Cit.* and *The Problem of Pain*, Macmillan Paperbacks, New York, (1962); *The Abolition of Man*, Macmillan Paperbacks, New York, (1975).

[27]Herrmann, *Op. Cit.*

[28]R.L. Green and W. Hopper. *C. S. Lewis: A Biography*, Harcourt Brace Jovanovich, New York (1974).

[29]C. S. Lewis, *Mere Christianity*, Macmillan Paperbacks, New York, (1960), p. 121.

An Extended Book Review Essay

THE POST-DARWINIAN CONTROVERSIES

RICHARD P. AULIE

6806 S. Jeffery Blvd., Apt. 2G
Chicago, Illinois 60649

Based on The Post-Darwian Controversies: A Study of the Protestant Struggle to Come to Terms with Darwin in Great Britain and America, 1870-1900, *by James R. Moore. London, New York, and Melbourne: Cambridge University Press, 1979. This is part one of a four-part essay.*

"*Some books are to be tasted,*" declared Francis Bacon, "*others to be swallowed, and some few to be chewed and digested.*" You would think that by now nothing much could be found out about Darwin that we might regard as entirely new, especially on matters religious. Surely, some will say, during the last 120 years theologians, biologists, and critics alike have written books on every conceivable aspect of the religion controversy that erupted when Darwin published the *Origin of Species* in 1859. "The Protestant struggle to come to terms with Darwin"—what? Hasn't everything been said on that topic? But every generation feels the urge to make its own contribution to the continuing stream of publications on evolution, indicating the lasting importance of Darwin's historic work. Of course, some books may be swallowed summarily as restatements of what has been know for a long time. Yet Bacon's worldly wisdom reminds us that now and again we might happen on originality. When we do, we should sit up and take notice.

This book is not light fare. A mere tasting will not do. The author's source materials are a broad range of once-influential articles and books by twenty-eight Christian scholars who wrote, during the period from 1870 to 1900, on their own religious responses to Darwin. His assessment is not at all polemical; it is a model of dispassionate scholarship. The difficulty is that the source materials are really theological ideas that are alien to our secular age. So we must follow the closely-knit arguments with our wits about us. Yet the prose style is entirely accessible and the theme, thoroughly arresting, is consistently intriguing. No doubt some will find it disquieting. With its novel point of view, the book flows well, and if we allow time for digestion, the theology brings us right back into a fresh understanding of Darwinian biology, which is the main thing.

The book already has been reviewed in *Faith and Thought* (1979, vol. 106, no. 1), *New Scientist* (Aug. 9, 1979), *Observer* (Aug. 26, 1979), *Times Higher Education Supplement* (Jan. 25, 1980), *Reviews in American History* (March, 1980), *Nature* (April 24, 1980), *Journal of Eccesiastical History* (April, 1980), *Isis* (Sept. 1980), and *Annals of Science* (Nov. 1980). James R. Moore,[a] the author, holds the doctorate from the University of Manchester and is now developing courses in the history of science at the Open University in England. In 1979 he wrote and narrated a television program, "The Tennessee Evolution Trial," for the Open University in conjunction with the British Broadcasting Corporation. The BBC crew came to Tennessee to produce the film on location. Because of its subject, the Scopes Trial of 1925, the program ought to be seen widely in this country.

An Arresting Theme

The main theme of Moore's book can be stated generally as follows. During the final three decades of the nineteenth century, those Protestant clergymen and Christian laymen who most readily accepted Darwin's theory of evolution by natural selection were decidedly orthodox and traditional in their theology (Chapter 11). They were church leaders who today might call themselves conservatives, evangelicals, or, in some quarters, even fundamentalists, as strange as that may seem. Their view was called "Christian Darwinism," the term having appeared in 1867 (p. 252), and in England and America they did much to pave the way for the new theory of evolution, even during the time when men of

[a] *Address: James R. Moore, Faculty of Arts, Open University, Walton Hall, Milton Keynes MK7 6AA, England.*

science were putting forward telling arguments against Darwin's theory. A second group, also orthodox, rejected Darwinism by falling back on two philosophical assumptions—that genuine science offers certain knowledge, and that biological species are fixed (Chapter 9). A third group of Christians rejected Darwinian evolution but favored an alternative theory of evolution; they were liberal in theology; they were most inclined to turn away from the established and ancient creeds of the traditional church, and in so doing they came up with evolutionary doctrines that were not derived from Darwin's thought (Chapter 10). The author uses the term "Darwinisticism" (p. 15, *passion*) to denote any such misunderstanding or modification of Darwinian evolution. This term, "Darwinisticism," was coined by Morse Peckham as an amalgam of "Darwinism" and "romanticism," and Peckham, editor of the variorum text of the *Origin of Species*, used it for this kind of adulteration. Moore sets out to explain how and why these three groups, the "Christian Darwinians," the "Christian Anti-Darwinians," and these practitioners of "Christian Darwinisticism," responded to Darwin as they did.

Moore has brought us the sense and feel of a large and diverse body of scholarship—120 publications by twenty-eight Christian leaders among the clergy and laity, plus a host of other publications. In so doing, he might have trod the easy path of sprinkling his pages with paragraphic quotations strung together with his own comments. This is not the case. He himself does the talking throughout, in a style that is elegant and urbane, at times magisterial. Nevertheless, with the benefit of judicious integrations of small excerpts from the heaped-up writings of his Protestants, we seem to be eavesdropping on those gifted people, as they pondered and argued and worried, fastening on this and that idea in Darwin's *Origin of Species*, and dwelling on one point or another of theology, seeking all the while to relate their Christian faith to the great issue of the day.

On the whole, these Christian writers were rather calm and deliberate, and Moore construes this point as significant in his interpretation of responses to the Darwinian challenge. They did not line up in hostile opposition to the theory of evolution. Rather, each assessed the impact of Darwin on his own understanding of the main tenets of Christian theology and belief, such as the doctrine of the Trinity, the immanence and transcendance of God, or the concept of Design. Such religious concepts are mere words to many people today. But Moore takes us a step further. Some of the conservatives managed to cast fresh light on what Darwin meant by natural selection precisely because they clearly saw the uniqueness of Christian theology and its significance for the emergence of modern science. They understood what Darwin meant, and in some cases Darwin heartily agreed with their published statements of his views.

A Dual Paradox

How did it happen that even while men of science in England and America were finding all manner of objections to evolution, during a time when the age of the Earth and the mechanism of heredity were still in dispute, the learned among the clergy and laity were putting forward altogether unusual propositions that actually supported

Those Protestant clergymen and laymen who most readily accepted Darwin's theory of evolution by natural selection were decidedly orthodox and traditional in their theology. They were church leaders who today might call themselves conservatives, evangelicals, or, in some quarters, even fundamentalists.

Darwin: a theory of biological origins was consistent with belief in the "Maker of heaven and earth," logic united the implication that man was related to the beasts of the field with faith in his unique creation, the survival of the fittest paralleled the doctrine of a benevolent Providence, Darwin had indeed quite done away with chance. How, on the other hand, did it happen that liberal theologians, whom we might expect to have been most open to all that was new in biology, came out against the new in evolutionary theory, on the grounds that liberal theology was incompatible with Darwinian presuppositions?

This is the dual paradox that Moore elaborates before us: the ancient creedal faith promoted the new in biology, while liberal theology shunned the Darwinian mode. How Moore explains this paradox is novel and intriguing, to say the least. He does so by exploring the orthodox theological tradition that spawned Darwinian thought, suggesting an affinity that will probably be surprising and unsettling to some readers, and by interpreting the responses made by his Protestant writers to their own conceptions of that tradition. Perhaps we can understand this paradox in terms of a thesis that by now ought to be well known, if not always well regarded, in the history of science: the Judaeo-Christian view of God and the world helped to make possible the rise of modern science during the sixteenth and seventeenth centuries. Indeed, Moore explains in his preface that his interpretation is but an extension of this view into nineteenth century biology.

Moore resolves this paradox as he discusses the responses to Darwin by the twenty-eight clergymen and laymen whose writings are his source materials. He shows that peace and tranquillity, rather than outright "warfare," characterized their responses to Darwin (Chapters 1-4). The non-violent character of their deliberations is surprising when we recall the frequent declarations among historians and biologists that church leaders were all obscurantists who are said to have arrayed themselves in heated and vulgar opposition to progress, only to be bloodied and vanquished by the forces of scientific light. This, too, seems less surprising when we take a look at how the opinions on evolution were communicated during the period in question. An emphasis on how this occurred is rather beyond the purview of Moore's interpretation. But in identifying the writers and the avenues open to them for making known their views, he casts further light on the important question of why any scientific idea is accepted or rejected. I should like therefore

to discuss this communication in the three sections that follow.

How Science was Communicated

Things were rather different in those days, and we can feel only a sense of remoteness and loss as we contemplate that remarkable time when theologians and scientists still talked to one another. Scientists, for their part, were still able to use the language of theology, and they often did so with seriousness of purpose and with no condescension. This is certainly the case among Moore's twenty-eight writers, of whom the following are examples.

Enoch F. Burr, a Congregational Minister in Connecticut, having studied astronomy and mathematics, lectured at Amherst College, where he declared against the philosophy he thought Darwinian evolution implied. John W. Dawson, at McGill University, was a prominent geologist and a Presbyterian, who wrote that Darwinian evolution could never produce the certainty that science required. An exception to Moore's finding of peace and tranquillity was Francis Morris, Anglican clergyman in Yorkshire, ornithologist, and ardent anti-vivisectionist, who for many years spoke out heatedly against evolution, beginning at the meetings of the British Association for the Advancement of Science in 1868 and 1869; "ineffable contempt and indignation" and "childish absurdities" were among the epithets he hurled at Darwinism (p. 197). George Henslow in England was a botanist and Anglican clergyman who came out for evolution but not by natural selection. An especially interesting figure was Henry Drummond, a Scottish naturalist and explorer in Africa, who was enlisted in a revival campaign of Dwight L. Moody and Ira D. Sankey, and who wrote the immensely popular book, *The Greatest Thing in the World* (1890; on I Cor. 13), which is frequently re-published today; he became a lecturer at the Free Church College in Glasgow, where in his evangelical writings he favored a brand of evolution based on the teachings of Herbert Spencer. Joseph Le Conte was a professor of geology at the University of California; his books on Lamarckian evolution were eagerly read among the clergy. In Scotland, James Iverach, with training in mathematics and physical science, became a Free Church minister and strong advocate of Darwin. The most prominent pro-Darwinian in America was Asa Gray, the renowned botanist at Harvard University; an orthodox Christian believer and member of a Congregational church (Calvinist at that time), he declared himself to be "a convinced theist, and religiously an acceptor of the 'creed commonly called Nicene' " (Quote on p. 304, from Gray's *Darwiniana*, 1876, 1973, p. 5). Gray's friend and collaborator in advocating Darwinian evolution was the remarkable and many-sided George F. Wright, a geologist at first by avocation, who, while serving Congregational pastorates in Vermont and Massachusetts, studied the Bible in Hebrew and Greek, made himself a translation from the German of Kant's *Critique of Pure Reason*, and identified the peculiar ridges in the neighboring countryside as glacial in origin, rather than alluvial, and with his success in following the final terminal moraine from Pennsylvania to the Mississippi River, became a leading American authority on glacial geology; at Oberlin College in Ohio he was for many years the editor of *Bibliotheca Sacra*, the prominent conservative theological journal, wherein he carried many of his articles favoring Darwinian evolution, some of which Darwin read and praised, and he wrote a biography of the revivalist Charles G. Finney (1891). The other clergymen and laymen in Moore's collection were equally accomplished. For instance, George T. Curtis was a constitutional lawyer who argued the defence before the Supreme Court in the Dred Scott fugitive slave case; he then turned his legal talents against Darwin in a philosophical critique that had a large audience.

The boundary between science and theology was by no means sharply defined in the lives and writings of these extraordinary men; they were unique hybrids, in whom both branches of inquiry combined to form a single unity almost unknown in our day. Most of the twenty-eight clergymen and laymen, of whatever persuasion in Moore's three groups, possessed in abundance the breadth of learning and fluency of expression requisite for discussing the question of Darwinian evolution. They certainly were prolific writers, and they must have enjoyed themselves. Pens flew, and printing presses rolled. Moore's bibliography lists forty articles and books written in the British Isles and eighty in North America. These publications sailed the Atlantic in both directions, and the ambitious authors travelled around on speaking tours. With respect to religion and science, as he points out, Victorian England and post-Civil War America formed a single community in which the theological issues raised by Darwin were repeatedly examined during the debate over evolution.

Of Metaphors and Conflicts

To a large extent, these writers operated within the professional circles of the time while developing their respective views. They communicated first with their own peers among both scientists and the clergy, who had made special studies of Darwin, and second with the public at large, who had not. They did not organize themselves into a common front against evolution; they were not enemies of one another in a conflict between religion and science. This "military metaphor," argues Moore, has been an unfortunate choice among writers to the present day as an interpretation of the post-Darwinian controversies, for it does not correspond to the facts. Scientists and theologians were not polarized in relentless opposition or in antagonism to one another; they could hardly have been so when scientists were still in doubt about the method and metaphysics of evolution, when many scientists were Christians, and when many clergymen were men of science.

Another point that may strengthen Moore's view that theologians and scientists were not separately united on opposing flanks has to do with the psychological motives of his Protestants in publishing all those articles and books. The Christian writers acted independently when they published, even while no doubt they often communicated informally with one another. The scientists did likewise. Each regarded his publications as personal property, as a means of self-fulfillment, and as a measure of his own success in life. For each, publishing an article or book was rather like acquiring land, a house, or silverware—the more the better.

Those Christians were prudent about making known their views in advance of publication, and at times we might have seen them rushing into print with unseemly haste, lest someone else take credit for work they considered their own. Such behavior might be considered not to be consistent with profession of Christian faith, especially by men of the cloth. Yet to act that way is perfectly reasonable. The desire to communicate is not the only worthwhile reason to publish. To the extent that these Protestants acted independently to promulgate their views in print, they did not have time to hatch plots against any ungodly scientists. As in the scientific enterprise, concern for reputation and priority prevented much in the way of conspiracy, and aborted any successful cooperation of a "military" character.

In Moore's view, undue emphasis on various dramatic episodes, such as the celebrated confrontation between Bishop Samuel Wilberforce and Thomas Henry Huxley (pp. 58-68), has encouraged the illusion of this polarity between evolution and Christianity. Moore finds (Chapter 1) that this military metaphor, with its vivid imagery of warfare and pitched battles, with evolution and theology lined up on opposing flanks, arose with the publication of two books. One was by John W. Draper, in 1874, *History of the Conflict between Religion and Science*, the other by Andrew Dixon White, in 1896, *A History of the Warfare of Science with Theology in Christendom*. While Draper said little or nothing about evolution and religion, and White used only twenty pages out of nine hundred to settle the question of origins, the unintended and ironic effect of their efforts has been to extend the military metaphor to accounts of the debates over evolution. "Historians have found little but 'conflict' and 'warfare' in the post-Darwinian controversies," he finds (p. 41).

Misconception of Fundamentalism

As an example of the deleterious effects of such imagery, Moore cites the widespread misuse and misunderstanding today of the term "fundamentalism" (pp. 68-76). Historians, in describing the responses to evolutionary theory in America, often tell us that the orthodoxy known as Fundamentalism raged against evolution until the close of the nineteenth century, and that Fundamentalism itself persisted into the twentieth. But the word "Fundamentalist" was not coined until 1920 (p. 70). Before that date, Fundamentalism was not a coherent movement, notwithstanding the publication in 1909 of the *Scofield Reference Bible*, the adoption in 1910 of the so-called "five fundamentals" by the General Assembly of the Presbyterian Church, and the issuance of the influential series of pamphlets, *The Fundamentals*, from 1910 to 1915. Moreover, at least four Christian writers, who were identified with the conservative wing of theology which later became known as Fundamentalism, early on came to terms with evolution. The first, Baptist theologian Augustus H. Strong, in his *Systematic Theology*, in 1907, conceded the partial truth of Darwin's theory as a method used by God (in 1946 edition, p. 76, 470 *passim*). The other three published in *The Fundamentals*. Princeton Theologian Benjamin B. Warfield in 1910 accepted evolution as a possible "theory of the method of divine providence" (p. 71). James Orr, Scottish theologian and still well-known author of *The Christian View of God and the World*, in 1893, also agreed that evolution might be regarded as a new name for creation. And George F. Wright, the talented glacial geologist, in 1911 asserted that Darwinian evolution was no threat to Christian faith. The views of Warfield, Orr, and Wright were already well known when they were asked to write for *The Fundamentals*. Fundamentalism should not be extended back into the last three decades of the nineteenth century in order to interpret the debate over evolution. "Therefore we shall have to look to the decade after the First World War to find a movement militantly opposed to evolution," Moore writes, "a Fundamentalism that supplied the imagery to reinforce the metaphor in which the post-Darwinian controversies had been cast" (p. 73).

Nor did wars and rumors of war characterize religion and science in late-Victorian England (Chapter 3). Famous scientists were men of Christian commitment, among them astronomer John Herschel, physicists Michael Faraday, James P. Joule, James Clerk Maxwell, and Lord Kelvin, and geologists Charles Lyell and Roderick Murchison. In 1864, several members of the Royal College of Chemistry circulated a statement that "it is impossible for the Word of God as written in the book of Nature, and God's Word written in Holy Scripture, to contradict one another" (pp. 83-84); they readily obtained signatures of 717 individuals, of whom 420 were Fellows of prominent medical and scientific societies. In 1874, the proto-statistician Francis Galton, who was Darwin's cousin, submitted a question-

Richard P. Aulie holds the doctorate in the history of science from Yale University, the B.S. from Wheaton College and the M.S. from the University of Minnesota. Formerly a high school biology teacher, he has published frequently in the professional journals on the history of science, including articles on the non-biblical and pre-Christian origins of the doctrine of special creation. Continuing his interest in the eighteenth and nineteenth centuries, he is now writing a book on the scientific results of the voyages of Captain James Cook. He is cited in Who's Who in the Midwest.

The dual paradox: the ancient creedal faith promoted the new in biology, while liberal theology shunned the Darwinian mode.

naire on religious beliefs to the Royal Society of London, to find that a majority of the Fellows were church members. And theologians were hardly pugnacious toward evolution. On the day after the epic Huxley-Wilberforce confrontation at the University of Oxford, the Rev. Frederick Temple, who became Archbishop of Canterbury in 1896, in a sermon at the same University gave a fair and quite calm appraisal of the problems raised by religion and science. A very interesting group called the Metaphysical Society was composed mostly of religious leaders of various hues. From 1869 to 1880 Arians, atheists, deists, freethinkers, Protestant bishops, and even Roman Catholics met over drinks and dinner for sprightly and learned discussions of timely issues, including evolution. Huxley and John Tyndall, who are both often credited with fulminations against Christianity, were members of this conglomeration. Indeed, Huxley in 1863 found that he was "pleasantly disappointed" by the accommodating attitudes of churchmen (p. 94). While many scientists were divided about Darwin's theory, theologians did not stand in opposition, "It was a few theologians and many scientists who dismissed Darwinism and evolution," Moore writes (pp. 88, 89).

Even that old gladiator, Thomas Henry Huxley, apparently did not think the military metaphor sufficient when in 1887 he fell back on the Bible for his metaphor of wine and wineskins. He obliquely credited his generation for recognizing that, in his words, "The new wine is exactly of the same vintage as the old, and that (rightly viewed) the old bottles prove to have been expressly made for holding it" (p. 1). What Huxley thought his contemporaries correctly realized, as Moore explains, was that the "new Darwinian wine was of the same vintage as the older causo-mechanical explanations" of nature, and that orthodox theology, Huxley's "old bottles," was sufficient to account for Darwin. In other words, the Darwinian theory of evolution embraced the same assumptions about nature that gave rise to modern science, assumptions that owed their origin in the sixteenth and seventeenth centuries to a reaffirmation of the Judaeo-Christian view of God and the world.

Huxley lived in a day when people still read their Bibles. He could use a scriptural allusion without hesitation, knowing that his readers would apprehend his meaning without difficulty; they did not require the precise explanation that Moore is obliged to give. So far have we advanced from that age!

Huxley's pungency reminds us again of the central theme of this book, that the Protestant writers responded to Darwin in terms of their own respective conceptions of Christian theology. "With but few exceptions the leading Christian thinkers in Great Britain and America came to terms quite readily with Darwinism and evolution" (p. 92). Of course, this coming to terms did not always mean completely accepting evolution by natural selection. Some did, some came up with another brand, and in some cases Darwin evoked outright rejection.

A Crisis of Faith

But all these Protestant writers did experience a crisis of faith, and this is the basis on which Moore builds his reinterpretation of the post-Darwinian controversies (Chapter 4). As they worked through Darwin's *Origin of Species*, they saw rising before them dire challenges to their personal faith in the Creator and in Providence, challenges to their conviction that design could be seen in nature, and to their belief in the benevolence of the divine character. Moore depends on Leon Feistinger's "theory of cognitive dissonance" in his analysis of how they resolved this crisis of faith. He identifies four steps in their formation of an independent opinion: (1) a personal, inner conflict, as the new theory challenged long-held conceptions; (2) a decision-making, as they settled the conflict by a personal commitment to one alternative or another; (3) a recognition of discrepancies, or a feeling of tension, called "dissonance" (p. 14, 111, *passim*), between the chosen alternative and the view that was left behind; (4) a reinterpretation, in order to reduce the "unpleasant state of mind" (p. 112) brought on by this "dissonance."

In each case, the resolution of the crisis of faith resulted in books and articles, Moore's source materials, to which he applies this ingenious scheme. To provide an example of how this theory works, Moore examines the strange case of St. George Jackson Mivart, "Darwin's most influential Christian critic in Great Britain," showing that the military metaphor cannot explain the personal travails of this deeply religious biologist and lay-theologian as he grappled valiantly with the portent of natural selection and human evolution for his faith (pp. 117-122).

The Darwinian Milieu

Part II of the book is called "Darwinism and Evolutionary Thought." Here we have a lucid discussion of what the Darwinian theory is all about (Chapters 5 & 8)—the concepts to which the Protestant writers responded, and which vex Christians still, such as natural selection, the struggle for existence, the question of human evolution. Moore analyzes the reception given the new theory by the leading scientists, some of them little known today, such as Edward Drinker Cope, Fleeming Jenkin, Lord Kelvin, St. George Mivart, Karl Nägeli, George Romanes, Alfred Russel Wallace, and August Weismann. We are reminded that the responses made by these scientists were every bit as challenging as those of the Protestants. Some Protestants, liking evolution but not natural selection, took to Lamarckian evolution, which for a time prompted rave reviews in American science (Chapter 6). In the discussion of the Lamarckism of Herbert Spencer (Chapter 7), we have an analysis of some so-called baneful aspects of society that are always blamed on Darwin, such as the doctrine of *laissez-faire*, and the cults of inevitable progress and rugged individualism. (Features of twentieth century life that are likewise heralded in certain quarters today as Darwin's doing include communism, city riots, Hitler, juvenile delinquency, modern art, and the Vietnamese war; these are

beyond the scope of Moore's inquires, and are not mentioned.) In the nineteenth century the vogue of Herbert Spencer provided an evolutionary rationale for the American way of life, forming a kind of secular religion. This always vexed Darwin, who certainly was too much of a humanitarian to be a "social Darwinist" (p. 161). Such a misrepresentation of Darwin's thought, found in Spencer, is one kind of "Darwinisticism." Part II therefore looks at two main currents of evolutionary thought: one is the elaboration of ideas derived from Darwin's *Origin of Species*, and the other is the influence of primarily Lamarckian conceptions of evolution—hence the respective designations that Moore employs, "Darwinism" and "Darwinisticism."

The Protestant writers, in dealing with their respective crisis of faith, did not find themselves at odds either with science or with theology, but in a rather more personal encounter with Darwinian thought, to which they often replied with theological language. Moore divides their responses into three groups, "Christian Anti-Darwinism," this "Christian Darwinisticism," and "Christian Darwinism." To these I now turn.

(to be continued)

Notes on "Science and the Whole Person"—
A Personal Integration of Scientific and Biblical Perspectives

Part 17

Euthanasia

RICHARD H. BUBE

Department of Materials Science and Engineering

Stanford University

Stanford, California 94305

Many of the problems arising from a discussion of science and Christianity result from the false assumption that certain words have only a single meaning. This is certainly true of discussions about evolution, and in our previous installment we argued that the same was true about the meaning of "abortion." It is no less true about "euthanasia." The word itself is formed from two Greek roots; the prefix "*eu-*" indicates "well" and the word *thanatos* means death. Thus to engage in euthanasia is to participate in and to work toward dying well. We cannot make much headway with the ethical problems surrounding euthanasia, therefore, until we know what "death" is and until we specify what dying "well" means.

The ancient Hippocratic Oath appears to rule out some forms of euthanasia:

> I will use treatment to help the sick according to my ability and judgment, but never with a view ot injury and wrong-doing. Neither will I administer a poison to anybody when asked to do so, nor will I suggest such a course.[1]

Both the ancient and modern concern of the physician is with the well-being of his patient, presumably in both living and dying. This concern transcends the purely biological processes of the patient and again presumably encompasses the whole person. The problem comes, then, in deciding just what it is that contributes to the well being of the whole person.

Definitions of Death

The popular statement, "He died," implies that death is an event. At one moment she was alive, and then at the next

Death must be viewed as a process and not simply as an event.

she was dead. Such a definition has been adequate for most cases in the past and still for many in the present. A variety of circumstances have forced us, however, to come to the conclusion that death must be viewed as a process and not simply as an event. One of the most dramatic of these circumstances is the development of techniques for organ transplants; in such a case the "donor" must be "dead enough" to justify removing the organ, but "not dead enough" so that the organ is still suitable for transplanting. Another relevant development has been the increase in sophisticated techniques to maintain biological life far beyond anything previously possible, and in some cases far beyond the apparent termination of self-conscious personal life.

Nelson[1] distinguishes four stages in the process of dying according to which criterion for death is chosen. (1) Clinical death is the most commonly encountered and the simplest to ascertain. When respiration and heartbeat stop, then clinical death has occurred. It is evident that clinical death is not irreversible, for there are many cases of patients who have been revived after having been pronounced clinically dead. Presumed reports of life after death described in such books as *Life After Life*[2] use death in this sense of clinical death. If an irreversible stage of death had been passed through, the people who report their impressions after clinical death would never have been revived to tell them.

(2) Brain death is the second stage of death. It is well known that if the brain is deprived of oxygen for a critical period, irreversible changes occur that prevent recovery of the living person. Brain death itself can be separated into two parts: first, death of the higher brain functions that control consciousness, followed by death of the lower brain functions that control the nervous system and operation of the heart and lungs.

(3) Biological death implies the irreversible and permanent end of all bodily life.

(4) Cellular death means the final termination of all life processes of any kind in the body, some parts of the body reaching this final termination more rapidly than others.

As long as a human being is alive (i.e., not "dead"), regard for that human life calls for actions that will preserve it; when a human being is dead, however, a greater freedom of action is possible, as for example in arranging for transplants. It becomes a critical question therefore to consider, "When does death occur?" Recognizing that death is a process and not an event, this question translates into another, "When should efforts to preserve life be abandoned?"

Various suggestions have been advanced to answer this question. (1) Since the irreversible stage of dying centers on the cessation of brain function, then this cessation is the criterion for death. The test of brain function is a measurable electroencephelogram (EEG), and therefore a flat time-independent EEG is the criterion of death. Although recovery from spontaneous flat EEG patterns is rarely if ever encountered, it is also known, however, that flat EEG patterns can be induced by certain drugs, from which recovery is commonly encountered. (2) A second suggestion calls for more extensive symptoms of death then simply a flat EEG. In addition to the latter it would include all the criteria of clinical death, lack of any response to stimuli or reflex action. All of these indications of death would be required to persist for a 24 hour period before death itself was accepted. (3) A third and even more stringent perspective downgrades the significance of brain action, and looks instead to the total loss of the integrated functioning of the various parts and systems of the body as the necessary condition for death to be pronounced.

These criteria are of necessity essentially empirical and biological in nature. They leave unsaid, however, other definitions of death that may be as important, or even more important for concern for the whole person. Such other definitions would focus on the value of human life as being centered in personal existence: the ability to experience self-consciousness, to relate to other human beings and to God, and to engage in rational and abstract thought. We argued in the case of abortion that the situation was different in the period before the biological development necessary for personal experience had occurred; we are led then to argue that problems involving death are different in the period after the biological equipment necessary for personal experience has irreversibly stopped functioning. In addition, we need to realize that the process of dying well includes much more than attention to biological processes. Concern with biological death leads to methods to sustain biological life; concern with personal death leads to methods to sustain personal life. The two are not always compatible.

Analogues Between Abortion and Euthanasia

Abortion is concerned with the ending of a human life before it has a chance to begin; euthanasia is concerned with the ending of a human life after it has run its course. Abortion is the decision to terminate a life which has the potentiality to become fully human; euthanasia is the decision to terminate (or allow to terminate) a life which has little if any further potentiality for being fully human in this life.

On the one hand it might appear that sanctions against abortion ought to exceed those against euthanasia since abortion is carried out against a life with the potentiality to become fully human, whereas euthanasia is carried out against a life without this potentiality. On the other hand, it might be argued that sanctions against euthanasia ought to exceed those against abortion, since euthanasia deals with a life which has been, and perhaps to some extent still is personal human life, whereas abortion deals with a life which has never been personal human life. All readers of this paper might be involved in euthanasia decisions involving themselves; they will not be involved in abortion decisions involving themselves.

A comparison of situations in abortion and euthanasia is set forth in the following table, according to a rough scale that extends from acceptable to unacceptable.

	acceptable ←					→ *unacceptable*
abortion	spontaneous abortion: miscarriage	early: pre-personal	before viability	harming fetus to save mother	—	killing viable fetus or infanticide
euthanasia	spontaneous euthanasia: death without intervention	late: post-personal	letting patient die without "heroic" measures	harming patient to relieve pain	actively ending life with consent	actively ending life without consent

It is recognized that such a table may be misleading, for we are not really comparing the same things when we speak of abortion and euthanasia. Our choice of speaking about abortion "before viability," for example, is the result of an effort to have a situation symmetric to letting a patient die "after viability has ceased" (viability outside the medical machine, in this case), rather than an indication that viability should be a major decision point *per se* in deciding on abortion. Also, of course, "letting a patient die" is hardly the same as "terminating the life of a fetus" when viewed from that perspective. With indulgence on the part of the reader, however, this table can serve to illustrate the spectrum of possibilities that exist in making ethical decisions about either abortion or euthanasia, and the approximate similarities between these decisions when viewed within the context of each type of issue.

The spectrum of choices in euthanasia starts with the most acceptable situation for any type of euthanasia being that in which we deal with the termination of biological life only, the death of personal life having already occurred. When both biological and personal life are still in existence, action which allows "nature to take its course" without interposing technological apparatus and techniques to delay death is the most readily approvable. When the patient is in severe pain and death is still some time off, the issue arises as to whether drugs should be given to relieve the pain if it is known that they themselves will act as a poison to shorten the remaining period of life. The most difficult cases to decide are those in which the patient requests active intervention to shorten his life; the most objectionable are those in which euthanasia is actively forced on a person who is unwilling to accept it, situations that presumably are completely illegal, at least in the United States.

These various possibilities in the spectrum of euthanasia can be considered more completely by considering the three main perspectives on the subject that are usually encountered.

Keeping Alive by All Means Possible

The practice of medicine is certainly a response to the Christian call to service. When confronted with suffering or disease, the Christian is never at a loss to know whether he should do his best to end the suffering and cure the disease, or whether he should allow God's will to take its course without his medical intervention. There is at the same time a reverence for all life which has its foundation more in monistic pantheism than in biblical Christianity. Pantheistically oriented religions have such a reverence for all life that great care is taken not to step on insects, and cattle needed to sustain human life are allowed to wander unhindered and untouchable for use as food. The biblical perspective recognizes the intrinsic value of all of creation as something fashioned by God for His particular purposes; although biological life is therefore valued, a clear distinction is made between biological life and personal life. The commandment, "You shall not kill," is a commandment against murdering a person, not against all ending of life. Although the Christian never hesitates, therefore, to confront suffering and disease as enemy intruders into God's creation, he also recognizes the need to distinguish between non-personal and personal life.

With its intense (and too often reductionistic) concentration on the biological basis for health, the medical profession finds itself by practice and often by law pressed into a consideration of *only* biological factors. Given the technological possibility of sustaining biological life, medical staff find little alternative except to apply this technology to its fullest, as long as competition among

This continuing series of articles is based on courses given at Stanford University, Fuller Theological Seminary, Regent College, Menlo Park Presbyterian Church, Foothill Covenant Church and Los Altos Union Presbyterian Church. Previous articles were published as follows. *1. "Science Isn't Everything," March* (1976), *pp.* 33-37. *2. "Science Isn't Nothing," June* (1976), *pp.* 82-87. *3. "The Philosophy and Practice of Science," September* (1976), *pp.* 127-132. *4. "Pseudo-Science and Pseudo-Theology. (A) Cult and Occult," March* (1977), *pp.* 22-28. *5. "Pseudo-Science and Pseudo-Theology. (B) Scientific Theology," September* (1977), *pp.* 124-129. *6. "Pseudo-Science and Pseudo-Theology. (C) Cosmic Consciousness," December* (1977), *pp.* 165-174. *7. "Man Come of Age?" June* (1978), *pp.* 81-87. *8. "Ethical Guidelines," September* (1978), *pp.* 134-141. *9. "The Significance of Being Human," March* (1979), *pp.* 37-43. *10. "Human Sexuality. (A) Are Times A'Changing?" June* (1979), *pp.* 106-112. *11. "Human Sexuality. (B) Love and Law," September* (1979), *pp.* 153-157. *12. "Creation. (A) How Should Genesis Be Interpreted?" March* (1980), *pp.* 34-39. *13. "Creation. (B) Understanding Creation and Evolution," September* (1980), *pp.* 174-178. *14. "Determinism and Free Will. (A) Scientific Description and Human Choice," March* (1981) *pp.* 42-45. *15. "Determinism and Free Will. (B) Crime, Punishment and Responsibility," June* (1981), *pp.* 105-112. *16. "Abortion," September* (1981), *pp.* 158-165.

several patients for its application is not a vital factor in the decision. As medical technology advances, the problem becomes more critical; we may approach the day when we are able, if we choose, to maintain biological life in a majority of cases well beyond the termination of personal life.

Here we face another version of a common question in scientific ethics: because we can do something, does this mean that we *should* do it—or even that we *must* do it? the question has two typical responses: (1) at least within limits we should and must as an exercise of our overall responsibility, recognizing that the ability to do it has been given to us by God; and (2) our ability to do something calls for us, as responsible stewards of God's creation, to make responsible choices based on the context of our knowledge —a responsibility that may often call upon us to declare a halt in such applications. Both responses are often offered also by non-Christian investigators, and hence have no unique identification with Christian principles. Somewhat curiously there is a poorly defined correlation of the first position with conservative Christians who normally are most critical of science, and of the second position with liberal Christians who formerly embraced science but recently have themselves become much more critical of technological developments. Some of the former argue that the means to sustain biological life are given to us by God, and that therefore refusal to use them is equivalent to suicide.

Keeping the patient alive by all means possible may also be an expression of personal pride on behalf of the medical staff. It is said that nurses have a byword, "Never have the patient die on your shift."[1] Professionally, death represents failure; keeping alive by all means is therefore an expression of professional ego, as well as of the factors discussed above. Physicians need a social and legal environment that will encourage them to consider the welfare of the whole person, rather than placing professional and legal stumbling blocks in the way of development in this direction.

There are, of course, legitimate reasons for the medical profession to "go all out" to maintain human life in all cases where terminal disease is not absolutely definite. Trust between physician and patient rests on the assurance that the physician will do everything in his power to preserve and restore the health of his patient.

The question ultimately arises: who shall decide when the physician should forsake extraordinary and unusual methods to prolong life and falling back on ordinary and usual methods, allow processes to take their course? The decision cannot be the physician's alone, for that would place an unfair burden on him, as well as undermining trust in the patient-physician relationship. If he or she is mentally competent to make such a decision, it would seem that the patient ought to have the prime prerogative in arriving at such a decision; the recently instituted practice of preparing a "Living Will" outlining personal desires before the period of terminal illness and questionable mental competence, is an attempt to make this uniformly possible. Judging mental competence in the absence of a Living Will may itself be no easy matter, and ultimately the decision passes to designated officers of the medical profession and/or society, and to the relatives of the patient.

Helping the Patient to Die Well (Passive Euthanasia)

In order to adopt that approach in which treatment of the patient is controlled by the desire to help him die well, rather than to fruitless efforts to maintain his life, the conclusion must have been reached that the process of dying is really all that the medical profession can anticipate for the patient. This must be accepted as a necessary ultimate stage in every personal existence, and not as a failure of the medical profession. Adopting this position does not mean that the patient *must* therefore die, as though God's healing activity were somehow discounted as a possibility, but simply that from the perspective of human medicine, no ultimate restoration of health is possible.

The desire to aid in dying well, as opposed to keeping alive by all means possible, changes drastically the types of treatment decided on.

The desire to aid in dying *well*, as opposed to keeping alive by all means possible, changes drastically the types of treatment decided on. So many of the techniques for prolonging life in the case of terminal illness have the effect of sustaining biological life, but of destroying personal life. Instead of being sustained in a friendly atmosphere surrounded by those whom the patient loves and cares for, the patient is isolated in a sterile hospital room separated from any personal contact except that of busy impersonal technicians, and is subjected to drugs and medical apparatus with its tubes, needles, catheters etc. which reduce the patient to a biological mass incapable of dignity, self-expression or personal relationships.

To help the patient to die well, we must know and respect what the patient wishes. At this crucial stage, the biological and the personal must not be separated. A misguided reverence for biological life that leads us to go to all lengths to preserve it, may actually be involving us in an assault on a person.

This process of helping the patient to die well by respecting his wishes and not necessarily invoking extraordinary measures to sustain life is often called "passive euthanasia." It is called "euthanasia" because specific measures are not used to prolong life; it is called "passive" because specific measures are not used to shorten life. Such a distinction overlooks the fact that when measures are not used to prolong life, this in itself is a measure used to shorten life. Attempts therefore to make a sharp demarcation between "passive" and "active" euthanasia may be inappropriate.

If a terminal condition is diagnosed before the patient has entered into extended technological treatment, his deci-

sion not to enter this treatment, or the decision of others on his behalf, is regarded as an example of passive euthanasia within the rights of the patient. If, however, the patient has already been under treatment using extraordinary drug and/or machine involvement at the time when the terminal condition is diagnosed, subsequent "pulling the plug" may be regarded as a case of active euthanasia, with the patient being open to the charge of suicide or those who made the decision on his behalf being open to the charge of homicide. There appears to be no fundamental moral difference between these two types of action, and although the latter will undoubtedly have generally more psychological complications, other reasons for considering it less acceptable than the former seem unfounded.

Another major gray region between passive and active euthanasia is that involving the giving of drugs to remove or reduce pain in the case of terminal illness, when it is known that the biological effects of the drugs will actively shorten life. Again the distinction between maintaining biological life and sustaining personal life is a crucial one, although it is not claimed that it will always be easy to make. Particularly incongrous would be the refusal to grant use of a pain-relieving drug because it was addictive. If care for the person as a whole, i.e., relieving severe pain and permitting personal experience, can be promoted by the use of a drug which has life-shortening properties, there should be no moral sanctions against it if chosen by the patient.

Deliberately Acting to End Life (Active Euthanasia)

The third major choice in the euthanasia spectrum is that of deliberately acting to end life in the case of a terminal illness, whether that act be a self-inflicted gunshot or overdose of sleeping pills, or an injection of poison by a person other than the patient at the patient's request.

A misguided reverence for biological life that leads us to go to all lengths to preserve it, may actually be involving us in an assault on a person.

Deliberately ending life is without question an extremely serious matter. Suicide in general can be justified only on the grounds that each person is ultimately in full authority over the disposition of his or her own life. This is not true even on the human level where each life affects many others, but it is certainly not true fundamentally where ultimate authority over each life must rest in God. The question that must be asked, however, is whether it is appropriate to morally identify voluntary euthanasia with suicide; may there not, indeed, be some specific cases in which voluntary euthanasia is motivated by a desire to save loved ones from prolonged personal suffering and financial burden and hence falls under the category of laying down one's life for those one loves?

Although all would cry out in repulsion against any schemes by which terminally ill patients were deliberately put to death against their will in order to save society the trouble and expense of caring for them, is it totally appropriate to level similar charges of homicide or murder against the friend who cooperates with a dying patient to provide him with the means of ending his life, or even accedes to the pleas of his dying friend to act so as to end his life? While staunchly defending the sacredness of human life and opposing steadfastly in the general case any attempt to violate it, is there no room for understanding compassion and forgiveness for the man who cannot bear to see his wife suffer and who agrees with her on her plea to help her die well? Given such extraordinary conditions, is it truly morally superior to do nothing and permit the dying person to be tortured?

Summary

The difficult questions surrounding issues related to the ending of human life again emphasize the significance of distinguishing between simple biological life and authentic human personal life. The Christian concern must be with the whole person, aiding that whole person to a full measure of biological and personal health insofar as this is possible, but recognizing the value of care for the person even when the possibility of cure for the biological system isno longer possible.

To truly participate in euthanasia, i.e., helping the individual to die well, requires a basic concern for the desires and welfare of the person involved. It requires also, of course, an ultimate concern for the relationship of that person and God, and does not lose sight of the will of God, who is Creator, Sustainer and Redeemer. These joint concerns focus on the best way to enable the individual to endure the physical and psychological pains of a terminal illness without violating his or her conscience or basic religious commitments.

It is perhaps beyond the scope of human efforts, however, to set forth guidelines so complete and inflexible that they prescribe for every case the course of action that is appropriate for a Christian. Just as abortion may be murder, but indeed need not be—as we argued in the last installment, even the act of self-euthanasia may be suicide, but indeed need not be. As in the case of abortion, no truly perceptive judgment may be made in at least some cases without examining the details of the cases themselves.

REFERENCES

[1]James B. Nelson, *Human Medicine*, Augsburg (1973)
[2]Raymond A. Moody, Jr., *Life After Life*, Stackpole (1976)

The New Baalism: God and Physical Theories

The gap between the theologian's thoughts on the Almighty and the physicist's measurements of the creation are nowhere better summarized than in the following two quotations:

> "What the universe was like at day minus one, before the big bang, one has no idea. The equations refuse to tell us, I refuse to speculate."[1]

> ". . .investigators who leave out God, the *raison d'etre* of the universe, find themselves lamentably handicapped in dealing with cosmological questions."[2]

Here we have two eminent physicists arguing that God is not or is essential to the cosmological question.

This paper is devoted to an analysis and criticism of two recent attempts at bridging the gap between physics and theology. The two books of interest, *The Tao of Physics* by Fritjof Capra (Berkeley, 1975) and *God and the Astronomers* by Robert Jastrow (New York, 1978), appear to be quite different on the surface.

However, both authors attempt to relate a current "state of the art" physical theory to the idea and conceptions of the Almighty. The position of this paper is that such attempts, while quite sophisticated, are nothing more than a new Baalism; a Baalism of physical theory: a view of God that does no justice, and in fact grave injustice, to a sound Christian understanding of the creation and the Creator.

To consider Capra first, he makes the bold claim that certain aspects of physical theory, specifically in nuclear particle physics "force us to see the world very much in the same way a Hindu, Buddhist or Taoist sees it."[3] His argument rests upon one particular approach to particle physics: the S-matrix theory of hadrons and the concept of the bootstrap idea.

Jastrow, on the other hand operates on the macroscopic scale and the evidence for the origin of the universe in some sort of "big bang" provides the basis for his wonderment at the lack of interest his colleagues have shown in speculating on the "creator".

Both however, have fatal flaws of argumentation. The first is the assumption that their respective physical bases are the ultimate, definitive ones. Capra, specifically, would be quite damaged in his argumentation if the more recent emphases on the quark nature of particle physics were to become the paradigm of modern physics. This later model, of even more fundamental particles, would be quite damaging to his connections of physical complementarity and Eastern mysticism. Likewise, Jastrow's position would be damaged were it shown that physical laws do *not* break down at $t=0$, so to speak.

A more fundamental objection could be raised however from a theological standpoint. Just as the Baals of the Old Testament were felt to occupy a particular niche,[4,5] the "gods" of Capra and Jastrow are seen to be resident in their respective physical theories: the Eastern deity residing in Chew's bootstrap physics and the Western deity residing in the time before the "big bang".

A recent review of Carl Sagan's *Cosmos* series addressed this question of the relationship of God and physical laws when it was argued,

> "If God is really there—like the New World and neutrinos—His reality is not destroyed by the inadequecy of our maps and concepts."[6]

Likewise, in considering the relationship of science and the first chapter of Genesis, Ridderbos argues,[7] "The Old Testament certainly nowhere conveys the idea that man would be able to learn from nature to know God properly without knowing him as the God of the covenant." Thus, we argue that these two books, in tying God to their physical theories present what might be called a "God of the data". No longer is God placed in the interstices of our knowledge of the physical universe (i.e. the "god of the gaps"). Rather, he is now determined by the current physical theory in vogue. Such a position we hold to be poor science and even poorer theology.

However, stressing that we cannot drive ontological significance from the creation, we must nevertheless agree with Gilkey, "If God is said to be Creator, then He is inescapably present in all nature. . ."[8]

The question becomes, how does one construct a viable theology of creation that avoids both the "God of the data" and the "God of the gaps"?

As a beginning, we might keep in mind the words of an Old Testament creation Psalm: "The heavens are telling the glory of God" (Psalm 19:1). We must always keep in mind this idea that all the heavens are telling "the glory of God". Our theology of creation must proclaim God's lordship over all nature and above all nature.

Lest we think this removes God from physics, we might remember the warning of Pyotr Kapitsa (a Russian physicist writing after the death of Stalin), "Dialectics alone cannot solve any scientific problem, and attempts to apply it as the unique clue to scientific correctness have hampered the progress of Soviet science."[9] We too must resist the temptation to apply our latest theologizing to physics, or vice versa.

Likewise, a warning can be addressed to the scientist, "a 'how' explanation, if made the final type of explanation, ultimately drains finitude of its meaning and promise."[10] What Gilkey wrote in the 20th century concerning the "spheres" of science and religion was presaged by Calvin in his commentary on Genesis, ". . .astronomy is not only pleasant, but also very useful to be known; it cannot be denied that this art unfolds the admirable wisdom of God."[11]

Thus, one could argue that in theologizing, one deals with the "why" questions; and in physics with the "how". A brief look at

the history of their stormy relationships over the years reveals that their greatest conflict arises when they cross these respective borders (e.g. the fundamentalist insistence on the "how" of creation as revealed in Gen. 1-3).

A second point is that too much emphasis has been placed upon the doctrine of the "instant" of creation. If our God is lord of all nature, the evidences of His sovereignity should be as evident today as they were 20 billion years ago. The latest Jewish translation of the *Torah* (Jewish Publication Society of America) seems to indicate this with its translation of Gen 1:1 as "When God began to create. . ." The lordship of God is over all creation, not just the initial 10^{-35} seconds.

Barbour, writing before the current dominance of "big bang" models of the universe, told his readers, ". . .the Christian need not favor either theory, for the doctrine of creation is not really about temporal beginnings but about the basic relationship between the world and God."[12] Further, the work of O'Connor and Oakley argues that,[13] "The principal theme of Genesis in all three of its main documentary sources is not that of beginnings but that of covenant."

Our understanding of the Creator therefore must possess certain qualities. Firstly, unlike Capra and Jastrow, the lordship of God is sovereign irrespective of the current "state of the art" in physical theorizing. As Murphy[14] argues, "the Christian doctrine of creation and its significance for modern physics are not dependent on this class (and I might add, any) of cosmological models."

Our doctrine of creation *and* Creator must not relegate His activity to a particular point in space or time. As Westermann reminds us,[15] "God is God precisely because he is Creator and that means that he is lord over all that has been created." This latter theme of sovereign lordship is present in a nascent, polemical form in Genesis; specifically in the account of the creation of the stars (Gen. 1:19). Vawter[16] reminds us that simply saying, ". . .and he made the stars", the scriptural writer is being anti-astrological and anti-Babylonian. The writer reduces the stars from deities or demigods to, as Vawter phrases it, ". . .pieces of created matter adhering to the dome of the sky."

Perhaps as Murphy suggests, we need to return to a doctrine of the Creator as sustainer, or as Luther put it,[17]

> "I believe that God has made me and all creatures; that He has given me my body and soul, eyes, ears, and all my limbs, my reason and all my senses, *and still preserves them.*"

This emphasis is faithful to the biblical witness of the importance of God's continuing covenant with His creation and is faithful to the Church's witness of "God being with us". Returning to the Psalms, we can once again proclaim,

> "O Lord, our Lord,
> how majestic is thy name in
> all the earth! (Ps. 8:1)

[1]James Peebles, in *God and the Astronomers* (Norton, New York, 1978) by Robert Jastrow; p. 124.

[2]Milne, E. A. *Modern Cosmology and the Christian Idea of God.* (Oxford, 1952); p. 62.

[3]Capra, F. *The Tao of Physics.* (Shambhala: Berkeley, 1975) p. 18.

[4]Gray, J. "Baal (Deity)" in *Interpreter's Dictionary of the Bible.* (Abingdon: New York, 1962); vol. 1, pp. 328-329. This provides a brief, technical account of Baals and Baalism.

[5]Michener, J. A. *The Source.* (Random House: New York, 1965). In this fictional account of biblical eras, Michener provides a very readable and vivid account of the appeal the Baals' must have exerted upon the ancient tribes; cf. pp. 173-331.

[6]O'Malley, W. J. "Carl Sagan's Gospel of Scientism" in *America* 144 (5): 95-98 (Feb. 7, 1981).

[7]Ridderbos, N. H. *Is There a Conflict Between Genesis 1 and Natural Science?* (Eerdmans: Grand Rapids, 1957); p. 62-69.

[8]Gilkey, L. *Maker of Heaven and Earth* (Doubleday: New York, 1959); p. 108, fn. 27.

[9]Kapitsa, P.; quoted in "Popular Science", Jeremy Bernstein, *New Yorker* (Oct. 8, 1979); pp. 169-175.

[10]Gilkey., *op. cit.*; p. 72.

[11]Calvin, J. *Genesis.* (Banner of Truth: Carlisle, Pa., 1965) p. 86.

[12]Barbour, I. G. *Issues in Science and Religion.* (Prentice-Hall: New York, 1966); p. 368.

[13]O'Connor, D. and F. Oakley. *Creation: The Impact of an Idea.* (Scribner: New York, 1969); pp. 2-3.

[14]Murphy, G. L. "A Positive Approach to Creation". *Journal of the American Scientific Affiliation* 32(4): 230-236 (December, 1980).

[15]Westermann, C. *Creation.* (Fortress, Philadelphia, 1974); p. 44.

[16]Vawter, B. *On Genesis: A New Reading.* (Doubleday, New York, 1977); pp. 45-50.

[17]Luther, M. *The Small Catechism* in *Concordia Triglotta* (Concordia: St. Louis, 1921); pp. 542-543.

Terry A. Ward
2207 Thunder Ridge Blvd. Apt. 2-A
Cedar Falls, Iowa 50613

Toward a Scriptural View of Euthanasia

Euthanasia is an issue in medicine today that is gradually becoming less controversial, and more acceptable. Judicial precedent and sentiment is growing with very little dissent. The decision to "no code" a patient, at one time passed quietly to the staff, is now out in the open. As Christians, we need to understand where these decisions are leading and understand the reasoning behind them. This reasoning must then be examined based on scriptural teaching.

The main arguments for euthanasia are the easing of suffering and utility. In cases where the pain is great and constant, and there is no hope of a cure, euthanasia is thought to be desirable. The suffering does not have to be for the patient alone, but also for his family. A petition from Protestant and Jewish ministers in New York sums up this idea: "We believe in the sacredness of human personality, but not in the worth of mere existence or 'length of days.' We no longer believe that God wills the prolongation of physical torture for the benefit of the soul of the sufferer. For one enduring continual and severe pain from an incurable disease, who is a burden to himself and his family, surely life has no value."[1]

The argument from the point of view of utility comes from both the family and society. The delivery of medical care necessary for life support is expensive. Even with insurance the cost can overwhelm the family. On the larger scale, can society justify the use of our resources, private or public, to maintain or prolong "unsalvageable" lives, while throughout the world millions of children are starving and health care is inadequate? It is a question of stewardship of both monetary and health care resources.

The efforts of physicians, legislators, and judges to define brain death have not been totally successful. Karen Quinlan showed us the dilemma. She continued to live after the plug was pulled

(passive euthanasia), leaving those around her perplexed at what to do. The next step in the progression would be to act to end her life (active euthanasia).

Euthanasia should be opposed by Christians on the basis of scriptural principles and other reasons.

The understanding of "the image of God" in man is the first and main principle. It is the key doctrine of Scripture that places value on any human life, and differentiates us from being just smarter animals. In some way God gave of Himself into each one of us, not in an "indwelling" way which is reflected when someone accepts His greatest gift, but in some way intrinsic to what we are we have part of God in us. In the beginning we were commanded to go out and subdue creation. We were to master it, become lord over it. Not so much in an exploitive sense, but to be beneficent rulers for our own good, and for creation's. In this way we reflect the image of God. We create things, and order them. We strive to know all, do all, and to find order in the universe. One of the high points of this are the scientific method and the technological applications of the knowledge found.

The abilities to reason and create do not complete the image of God in man. Research into animal intelligence, especially in the use of language, leads many to think that man is not so unique after all, though this is disputed by the behavioralists. It is hard to dispute the objective evidence of a chimpanzee using a tool (a twig) to gain a specific end (a termite), but even the most ardent "animalist" is forced to accept that there is a quantum difference between man and the most intelligent of animals.

Personality has been cited as being part of our uniqueness. Certainly this is part of it, but alone is not enough as any pet owner can tell you.

The completing factor to the image of God in man is twofold. The first part is that we are loved by God. This is not a new idea. Thielicke stated it well in *The Doctor as Judge of Who shall Live and Who shall Die*. "The basis of human dignity is seen to reside not in any immanent quality of man whatsoever, but in the fact that God created him. Man is the apple of God's eye. He is 'dear' because he has been bought with a price: Christ died for him. Thus man stands under the patronage of an eternal benevolence and is sacrosanct. Whoever touches man has to do with God himself."[2] It is God's love that gives the ultimate source of meaning to existence. Man is special, whether he wishes it or not.

A step down in scale, and certainly less absolute is the value a life is given when it is loved by another person.

Even being loved is not enough. It takes the ability to return or initiate love to complete the circle. This implies a choice, a freedom to accept and return love or refuse it. It is the risk of refusal that substantiates love (see Romans 5). It is the possibility of interpersonal relationships with God first, and then others which makes man unique in creation. Bernard Ramm affirmed this in a 1974 article in the *Journal ASA* on bioengineering by stating that the true humanity of man, as laid out Genesis 1 and 2 is realized in the male-female, husband-wife, and parent-child relationships.[3]

Thielicke, following Heidegger's view that self-consciousness is the distinguishing factor between human and other biologic life states that "This consciousness of self has reference particularly to knowledge about what lies ahead, and hence also to knowledge about death. Man's anxiety and hope have reference to the future, whereas the animal, not having a consciousness of self, remains a prisoner of the present moment."[4] This self-consciousness and knowledge reflect themselves the decisions and the relationships that are effected by the decisions.

In summing this idea up, the image of God in man consists of three parts: (1) Man's intellect, will, rationality, creativeness, self-consciousness, etc. (2) The value given to our lives because we are loved, first by God, and then by others. (3) The affirmation of our humanity by returning God's love, and returning and initiating love towards others.

God has given human life a very high standing. It is because of this intrinsic value that murder is a sin (Gen. 9:6). Is euthanasia any different in its end result? The act of euthanasia is uncreative, denying the image of God. It places man at the same level as animals.

The patient who chooses euthanasia is committing suicide. He kills himself when he no longer wishes to live and be useful (creative, loving, receptive of love, etc.) The problem, aside from the image of God within us, is that in choosing death, the patient refuses the will of God. A Christian's life is no longer his own, but is under a new lordship. Whether he lives or dies, it is not for him to choose. If it is God's judgement that in suffering and dying he may be of use, then so be it. We all have heard of many cases of people with only short periods of time left to live who accomplished much good in that time. The witness of dying godly men has ever been a fruitful means of adding to God's family. It would seem that euthanasia is a lack of trust in God's love, and a rebuttal to His grace being sufficient.

The issue here is the Christian doctrine of suffering. The whole book of Job is about a man who should have ended it all, yet he believed in God's guidance in his life. Christ suffered horribly to accomplish our salvation. Paul rejoiced in his suffering for Christ and the Gospel (Col. 1:24, Phil. 3:8), and commanded us to "exult in tribulation" (Rom. 5:3 NAS). All of this is not just because God wants his people to be masochists, but to accomplish His will in each life: perseverence, proven character, hope, and faith. Indeed, James tells us to count it all joy when we encounter various trials and testings because they produce faith and endurance to make the Christian complete.

The point of this is that suffering is not an evil to be avoided, but something to be expected in each life to make us "perfect and complete" (James 1:4). Both Viktor Frankl, a psychiatrist who survived the concentration camps of World War II and Thielicke agree that life finds its meaning in suffering: No matter what the situation, the freedom of choice remains. The choice is one of attitudes, of how to accept the suffering. Frankl said, "The way in which a man accepts his fate, and all the suffering it entails, the way in which he takes up his cross, gives him ample opportunity—even under the most difficult circumstances—to add a deeper meaning to his life. It may remain brave, dignified, and unselfish. Or in the bitter fight for self-preservation he may forget his human dignity and become no more than an animal. Here lies the chance for a man either to make use of or to forego the opportunity of attaining the moral values that a difficult situation may afford him."[5] Thielicke refers back to the presence of self-consciousness. It is because of this that man is able to react to suffering. It is the reaction to suffering that gives meaning to life.[6]

Medically, much more can be done to suppress pain than in the past. Research has produced many compounds over the last thirty years that help relieve pain.[7,8] In some cases the use of drugs may not be desirable due to the side effects, but in such cases surgery to relieve pain may be effective.[9] It is in cancer victims that euthanasia is highly advocated, even though pain is not a major factor in more than half of the fatal cancers.[10] Pain from cancers metastatic to the bone may often be treated effectively with radiation.[11]

Psychologically, pain can be very tricky. It can be exaggerated. Personality can greatly effect how pain is perceived. The dynamics of the situation must also be looked at closely. Great care would have to be taken to determine whose suffering was being relieved, the patient's or the relatives'.[12]

The final argument against euthanasia has been cited by many, including Schaeffer and Koop in *Whatever Happened to the Human Race?* It is known as the wedge effect. It is a gradual, subtle, and erosive decay in the attitudes surrounding death, occurring sequentially that would allow great changes to take place in smaller, less noticeable steps. Thus far our society has gone from one that respected life to one that allows babies to starve in the nursery because they are deformed; to one that allows abortion as a form of birth control; to a society that would wish for an easier way to handle the elderly and the terminally ill. If the dying can choose their time of death, and doctors and/or family choose death for the unconscious "hopeless", the extension of this to the deformed, mentally retarded, psychotic, deformed infants, and senile aged cannot be too far off. It is assumed that the quality of these lives is so low as to merit the release of death.

The idea of stewardship of resources or "triage" is powerful, and it must pose an even greater dilemma in less fortunate areas. Euthanasia as an act because the family is going broke is vile and abominable. It is a sad commentary on our society that this is a consideration at all. I understand it. The materialism of our society traps us all in many ways. For what length of time should life be prolonged while reducing the family to poverty?

The difference between ordinary and extraordinary means of life support is becoming less distinct. Even smaller community hospitals are getting highly sophisticated systems that were once found only in large medical centers. What was once a "modern medical miracle" is now an everyday occurrence.

I have read that the good doctor is aware of the difference between prolonging life and prolonging the act of dying. The decision to discontinue aggressive treatment is sometimes arrived at with difficulty, and sometimes quickly. It is my hope that it never becomes too easy.

[1]Norman St. John-Stevas, *Life, Death and the Law*, Bloomington, Indiana: Indiana University Press, 1961. pg. 269.

[2]Helmut Thielicke, *The Doctor as Judge of Who Shall Live and Who Shall Die*, Philadelphia, Pa.: Fortress Press, 1976. pg. 27.

[3]Bernard Ramm, "An Ethical Evaluation of Biogenetic Engineering," *Journal of the American Scientific Affiliation*, Vol. 26, #4, Dec. 1974. pg. 140.

[4]Thielicke, pg. 16.

[5]Viktor E. Frankl, *Man's Search for Meaning: An Introduction to Logotherapy*, New York, N.Y.: Pocket Books, a division of Simon and Schuster, Inc., 1963. pp. 106-107.

[6]Thielicke, pp. 16-17.

[7]St. John-Stevas, pg. 273.

[8]John A. Bevans, ed., *Essentials of Pharmacology*, Hagerstown, Maryland: Harper and Row, 1976. pg. 234.

[9]George W. Thorn, et. al., editors, *Harrison's Principles of Internal Medicine*, 8th edition, New York, N.Y.: McGraw-Hill, 1977. pp. 19-20.

[10]St. John-Stevas, pg. 273.

[11]Thorn, et. al., pg. 1763.

[12]St. John-Stevas, pg. 273.

Other Bibtiography:

Claude E. Frazier, editor, *Is it Moral to Modify Man?*, Springfield, Ill,: Charles C. Thomas Pub., 1973.

Wayne E. Oates, *The Revelation of God in Human Suffering*, Philadelphia, Pa.: Westminster Press, 1946.

David J. Martinez
8309D Portsmouth
Darien, Illinois 60559

Physical Fitness and the Course of Life

Athletic contests along with the corresponding competitive emphasis on the physical fitness that of necessity accompanies them have become a way of life in contemporary America. Being in good condition is considered a basic essential of better living. This point can be extended into that unique feature of the body of the Christian, namely, that of being the temple of the Holy Spirit. In fact, in the New Testament, these two phases, the physical and the spiritual are combined, with the physical either leading into its spiritual counterpart, or the physical being so described that it is in some degree an example of such. In doing this, the New Testament authors, and in particular Paul as the apostle to the Gentiles, have drawn from a long cultural history of physical fitness and prowess exhibited in widely publicized and attended contests. The continuity of these events extended over a period of hundreds of years, reaching into Christian times until the beginning of the fifth century AD.

In the early accounts of Greek culture, athletic contests were held in connection with funerals. These have a well-defined place in Homeric literature. A chariot race was held commemorating Patroclus (*Iliad*). On other occasions there was boxing, wrestling, foot races, spear fighting, and such. Prizes given were a woman slave, a mare with a mule foal, a basin, two pieces of gold, a cup, a mule six years old, a tripod to stand over open fire, a silver bowl, an ox, weapons taken from a fallen enemy, and a spear. An ordinary prize for a foot race was an ox hide taken from a sacrificial victim.[1]

In 776 BC, the traditional date coming down to us, the Olympic festival was founded. At Olympus was located the chief sanctuary of Zeus. The games as today, were held every four years, attracting representatives from many of the city-states of Greece. There was a religious truce which protected celebrants to and from and while attending the festivities. The list of victors from the first of these contests is the earliest on record.[2]

The real glorification of physical accomplishments came a little later in the Golden Age of Greece. They were recorded for posterity in the lasting qualities of the famed literary works of Pindar (522-443 BC), the "poet laureate" of the great festivals of his day. In this 5th century BC, they lasted for five days, beginning with a sacrifice and ending with a feast. The order of events in Pindar's day were (1) single foot race; (2) double stadium foot race; (3) long race; (4) pentathlon; (5) wrestling; (6) boxing; (7) pancratium; (8), (9) and (10) boys foot race, boxing and wrestling; (11) race in arms; (12) chariot race; and (13) horse race. Pindar greatly admired Athens and made frequent visits there. He was what would be called today an avid sports fan, and lavished great praise on the winners of the Olympiad and other great athletic festivals. In his efforts he exacted beauty and skill, raising the victors in these contests to a plane but a short distance below that of the gods.[3] The great contemporary sculptors appeared to illustrate his verse by displaying admiring attention as they carved out physical excellence in the statuary of the winners.

In his lines, the poet lends emphasis to the skill, courage and the smile of fortune upon the winner and calls to memory previous distinctions won by him or members of his family. The crown of the athlete brings credit to his home, city and country. In each ode

the poet mentions the god in whose honor the particular games were held, or the festival for which it was composed. The text was full of ancient myth usually connected with the country of the victor. The style was full of metaphor. To give a vividness to the fullest limits of human achievement which occurred in the games, he borrows metaphors from the remotest reaches of travel and navigation. The merits of the victors are countless as the sands or pebbles by the sea.[4] The Olympiad stands as the crown or flower of the festivals. As such it is peerless as water, bright as a god and brilliant as the sun.

There was also a practical side to all of this as well as the poetic. Long preparation needed for participation in the games and training for a given contest obviously demanded daily exercise. This had a side effect that was valued. It kept Athenian youth in top condition for any emergency, and wars in those days were certainly periodic. The tradition was perhaps first set at the Battle of Marathon. In later decades, Thucydides and other historians further affirm its value. It must be noted that the athlete was out to win a contest of skill. His primary purpose was not to amuse and entertain spectators. It was not until a later Roman period that this became popular. In this culture, the winning boxer for example was not the best among his peers, but rather a killer contracted to do his job by men who did not box at all.

Game participation was open to all Greeks, who were encouraged to acquire the necessary skill. At one time it was the occupation of the aristocrat but by the time of Pindar and Pericles this was no longer the case. Often in fact the poor were able to compete by being sponsored by an aristocrat. Athletic virtues had reached down to the general male Greek, and their skills, in addition to the Olympiad, were displayed in games at Nemea, Delphi, and Corinth. It was all for the victor's wreath. There were however in addition, celebrations at home given by family and friends. Without doubt he was accorded great honor among his fellow citizens.

It was against this background that the apostle Paul recognized the prime place athletic contests enjoyed in the culture of his day. For this reason he was able to make some poignant applications. "For physical training is of some value, (for a little while), but godliness has value for all things, holding promise for both the present life and the life to come." (1 Tim. 4:8) In 1 Cor. 9:24 and the verses which follow he elaborates further. "Do you not know that in a race all the runners run, but one gets the prize." What he is saying is that *on the one hand*, many run; *on the other hand*, one gets the prize. Then, unlike so many of our day, he commends achievement—in order to attain or make one's own the award "Run in such a way as to get the prize." (v. 24b) He uses a strong injunction to *make one's own*. He then takes up a motif known in the diatribe literature. This was a bitter or abusive discussion on a limited topic, and was used by the Cynic and Stoic philosophers. Best known among these were Bion and Teles. The material was composed in highly inflammatory language interspersed with irony and invective. It indicated an intense struggle. As such it entered the exhortations of Paul and also Seneca. It was a prominent feature of rhetoric. Obviously it did not signify passive suffering as it does so often in our modern usage. As for the athlete, and in the race of the Christian, temperence and moderation were the way of life. "Everyone who competes in games goes into strict training." (v. 25) The prize is the wreath. The one in a race will dry up or is perishable. That of the Christian athlete of course is not. It is imperishable. The winner did not get there running aimlessly or beating the air. "No, I beat my body and make it my slave so that after I have preached to others, I myself will not be disqualified for the prize." (v. 27).

In this respect in ancient contests as well as modern, there were rules set down to which participants had to conform. If they failed to do so, they were then disqualified and did not receive the crown. This is made clear by II Tim. 2:5. "Similarly, if anyone *competes as an athlete* he does not receive the victor's crown unless he competes according to the rules." As anyone who follows modern contests knows, officials can be most stringent in their interpretation of rules. A case in point is cutting in on a runner in a foot race. Without doubt this has been done at times and it was either not noticed by the officials, or it was just overlooked. Such is not the case with the Christian athlete. The rules are strictly enforced. God is the final arbiter.[5]

What can happen is aptly illustrated in a brief description in Gal. 5:7. The NIV here brings out the literal force of the text. "You were running a good race. Who cut in on you and kept you from obeying the truth?" The result of cutting in on a runner may in some cases result in physical injury. In other instances it may be limited to impeding his progress toward the goal. It will slow him down by breaking his stride along with the rhythm of his pace. This is what the Judaizers had done in Galatia. The Galatians were running well, conforming to the line of thought the apostle had taught them, having received their salvation by faith apart from the works of the law. This doctrine they had been teaching and upholding in their church. Then these Judaizers came along and threw them off stride by cutting in on them. They did this by adding law keeping and circumcision as essential for salvation. Thus these Gentile believers were hindered in their faith and some stumbled on the race course. They were being confused in their doctrine. Those who actually cut in on them would bear the judgment. As for the Galatians, it is implied that they were to recover their stride and maintain their firmness in the liberty of Christ.[6]

The Colossians had problems of a different nature. They, too, were progressing toward their goal. "Do not let anyone who delights in false humility disqualify you for the prize." The person is then described as setting up idle notions of what to do which have no connection with the Head. The word rendered here as *disqualify* is "to decide against by bad umpiring." This had become a source of frustration. They were to present their conduct to higher authority, much in the same way appeals today are made to the Commissioner of Baseball in similar situations. If the call does not conform to the rules, it will be overturned. Thus God overturns decisions which are not according to scriptural stipulations. They were to set their hearts on things above (3:1). As for Paul himself, he states, "But one thing I do. Forgetting what is behind and straining toward what is ahead, I press toward the goal to win the prize for which God has called me heavenward in Christ Jesus." Near the end of the course of his life he also could solidly affirm: "I have fought the good fight, I have finished the race, I have kept the faith." (II 4:7). For this the Lord, who was a righteous judge, would award him the crown of righteousness in that day. (v. 8).

In summary, the Christian is called as an athlete in prime condition to a race. This is in the best of the Greek tradition. In his participation, he must abide by the rules of the game in order not to be disqualified. He must guard against persons cutting in on him while on the race course, causing him to fall or lose his stride. He must be alert, guarding against bad umpires calling poor decisions, not letting such matters frustrate him, but trusting his appeal to the Lord, the Righteous Judge. His goal lies ever ahead while in the body, seeking the prize of the upward calling in Christ Jesus. This one obtains the crown.

[1]Seymour, pp. 144-147.
[2]Hammond, p. 97.
[3]Sandys, p. xxix - xxxi.
[4]Sandys, translation.
[5]Hawthorne, pp. 118-120.
[6]Burton, p. 282.

Bibliography

Burton, Ernest DeWitt, *A Critical and Exegetical Commentary on the Epistle to the Galatians* (Edinburgh: T & T Clark, 1921).

Hammond, N.G.L. *A History of Greece to 322 BC* (Oxford: A History of Greece to 322 BC (Oxford: Clarendon Press, 1967).

Hawthorne, Gerald F. (ed) *Current Issues in Biblical and Patristic Interpretation* (Grand Rapids: William B. Eerdmans Publishing Co., 1975), pp. 115-127—Chapter—"Paul's 'Cutting' Remarks about a Race" by Carl DeVries, pp. 118-120.

Sandys, Sir John (tr.), *The Odes of Pindar* (Cambridge: Harvard University Press, 1914).

Seymour, Thomas Day, *Life in the Homeric Age* (New York: Biblo & Tannen, 1965—reprint 1905).

New Testament Quotations—*New International Version* (NIV)

The Greek New Testament—United Bible Societies (3rd ed), 1975.

Edmund R. Woodside
660 Forest Avenue
Pasadena, California 91103

God's Image in Man: The Source of Human Creativity

Human creativity, a consequence of God's image in man (Dorothy Sayers is known for her advocacy of this viewpoint), is defined as "putting matter together in new patterns and so creating new forms that were not there before." At the core of much creativity is the perceiving of often odd and striking likenesses, the relating of like things in unexpected ways to form a new unity that was never before noticed. It is my thesis that such perceptual acts are crucial to theological, scientific, and artistic creativity. As a Christian, I believe that the theologian, the scientist and the artist are really discovering a never before noticed aspect of reality when they appear to be producing something new. Thus all human creativity is composed of acts embedded in discovery and exploration—any human creator is "thinking God's thoughts after Him." And faith is essential to all such creativity. Insights gained from the creativity of the artist can be of great help to technologists and engineers today. In particular, mastery of physical reality in creating any new object is best done in a spirit of love where the creator cooperates with, rather than opposes, nature's forms and structures. New technologies created in such a manner are not to be feared if carefully studied and regulated so as to minimize undesirable side-effects; the development of more such new technologies is essential to the well-being of humanity now and in future times. Some biblical presuppositions that enhance creativity in technology as well as other disciplines are listed and discussed.

What is the meaning and implication for our time of the biblical assertion that man is made in the image of God? Genesis 1 asserts that God made the universe, the whole space-time continium, and declared that it was good. And to climax creation God made man:

> "God created man in the image of himself,
> in the image of God he created him,
> male and female he created them." (*Gen. 1:27*)

As Dorothy Sayers had ably pointed out,[2] the expression "in the image of himself" has been a source of controversy and perplexity to church people through the ages. It is now generally agreed that the many pictures of God as an austere old gentleman directing creative acts while perched on a great throne embedded in a cloud-bank are to be taken as only symbolically true. The image, whatever the author's meaning, is shared by male and female alike; the agressive masculinity of the pictorial Jehovah is used to symbolize power, rationality, and determination; and nothing more is intended. Man speaks of God only by making analogies to human experience; accordingly the Trinity and man as a species is always presented in the Bible in masculine language which should not be interpreted literally—God is a spirit, He is pure being. "I am that I am."

In what ways does man bear the image of God? Clearly man does not resemble God as a pure spirit; man has a body and parts that are clearly seen to be related to other creaturely life; i.e., the higher animals. It has been argued that man's immortal soul, his self-consciousness, his intellect, and his free will are characteristics of human nature that uniquely relate man to God. Certainly these are all components of the complex nature of man that could be related to man being made in God's image. But is it not possible that the author of Genesis had something particular in mind? As Dorothy Sayers points out:

> "It is observable that in the passage leading up to the statement about man, he has given no detailed information about God. Looking at man, he sees in him something essentially divine, but when we turn back to see what he says about the original upon which the 'image' of God was modeled, we find only the single assertion, 'God created'. *The characteristic common to God and man is apparently that: the desire and ability to make things* (italics mine)."[2]

In what ways does a man bear God's image in his human creativity? Before we can answer this question it must again be stressed that we are using the language of analogy and metaphor. Whenever we speak of something which lies outside ordinary experience like God's nature we must bridge the gap by making use of analogies to experience with which we are familiar. In doing this we must clearly recognize that if the analogy is pressed too far and too literally, it will break down. Today physicists do this type of thinking routinely. No one has ever seen an electron—we have only a wealth of experimental data from which we must try to extract coherent meaning. Physicist's have found it very useful to think of the electron sometimes as a "wave" and sometimes as a "particle," both pictures being taken from the realm of everyday human experience. These pictures, properly used, present a coherent explanation of the electron's behavior. But the physicist is well aware that both these terms are analogical—they are metaphors which if pressed to their limit are found to be incomplete and mutually contradictory.

Similarly the bible makes use of analogical, picture-language in describing God's nature. As examples of this use of language consider the biblical references to God as King and as father. Thinking of God as father enables us to picture God as kind, careful, deeply caring, unselfish, and forgiving in his dealings with men just an an ideal father deals similiarly with his children. But we don't press the metaphor to extremes, for we must compare God to an ideal father, not to a father who is selfish and unjust; and the fact that a human father brings about children by procreation has no bearing whatsoever as to how God brings physical reality into existence. In other words we use metaphorical language sensitively, paying full regard to its always partial nature.

Now we can more fully consider how God's creativity may be analogously reflected in man's creativity. There is one clear way in which God as Maker is clearly different from man as maker; God is a maker of something out of nothing whereas man can only rearrange the unalterable and independent units of matter in the universe, building them up into new forms. Note that every man is a maker, for everyone spends his life "putting matter together in new patterns and so creating forms that were not there before.

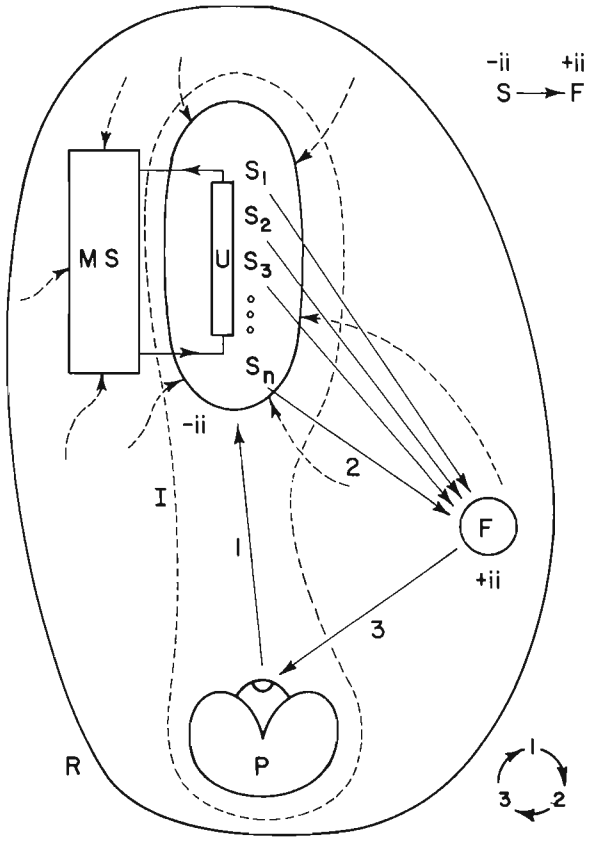


Figure 1. The structure common to human creative acts—such acts being rooted in exploration and discovery. An essential component of the creative process is commitment to a matrix of basic presuppositions about reality, such commitment enabling the explorer to focus on the objects of interest. These presuppositions are tacitly held by the explorer, he *indwells* them and they enable the explorer to focus upon striking and unusual likenesses between objects of physical reality, their behavior patterns, and the underlying law-structures that govern their behavior patterns, and the underlying law-structures that govern their behavior. The finding of such striking analogies is at the heart of the creative process.

Nomenclature:

R - Reality; S - $S_1, \ldots S_n$ - subsidiary clues details, basic presuppositions about reality that the explorer is tacitly committed to; F - Objects of focal attention; P - The person, the explorer, who causes the subsidiaries to bear on the focus of his attention; I - The person indwells the subsidiaries in order to focus on F. Since this indwelling is tacit, we are not able to render them explicity.

→ Encounters with an objective reality causes the explorer to become committed to these clues, presuppositions..; 1,2,3, -The Exploration Cycle: 1. The explorer indwells a set of subsidiary clues, particulars, basic presuppositions. 2. The subsidiaries bear on the focus of the explorer's attention. 3. The explorer becomes aware of new details, patterns and coherences of the focal objects striking analogies being observed. A new way of structuring reality is thereby recognized; or, if you like, a new reality-structure is brought into being.

+ii - Of intrinsic interest in this integrative, exploratory activity; -ii - Not of intrinsic interest in this integrative, exploratory activity; MS - Metasystem of culture, general human values; U - Undecidability, basic questions of a discipline that are not decidable from within the discipline. Often, the emphasis on certain subsidiaries and the lack of emphasis of others comes from criteria outside the discipline you are working in.

This is so intimate and universal a function of nature that we scarcely think about it. In a sense, even this kind of creation is creation out of nothing. Though we cannot create matter, we continually, by rearrangement, create new and unique entities.'" It is the artist who comes closest to God's unique attributes of being able to create something out of nothing for he can create works that exist only in the mind. A creative carpenter must work with rearranging and altering the fixed components of the material world, whereas the artist, say a poet, works with components of the imagination that increase by a continuous and irreversible process, without any destruction of what went before.

What is at the core of all human creative activity? It is the perceiving of often odd and striking likenesses, the relating of like things in unexpected ways to form a new unity that was never before noticed. The artist's or the scientist's imagination creates by perceiving a likeness between a number of things that at first sight appear to have no measurable relation, and it recognizes in them a new kind of unity, a new universe, that can be handled with power as if it existed independently, and whose power is operative in the world of things that can be observed and measured. Both artist and scientist are really explorers who discover a unity of new likenesses that maintains its independent existence due to the activity of the Divine Creator, Maker of Heaven and Earth. Thus any human creator, in a real sense, is "thinking God's thoughts after Him."

What else is central to the creative activites of man? In their creative activity the scientist and the artist share a similar respect for beauty. As Henri Poincaré points out:

> The Scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful... intellectual beauty is sufficient unto itself, and it is for its sake, more perhaps than for the future good of humanity, that the scientist devotes himself to long and difficult labors. It is, therefore, the quest of this especial beauty, the sense of the harmony of the cosmos, which makes us choose the facts most fitting to contribute to this harmony, just as the artist chooses from among the features of his model those which perfect the picture and give it character and life.[4]

Here we see another very important aspect of all human creativity. Man as creator is motivated by his faith that beauty expressed as essential unity exists in all the cosmos. It is by faith that both Artist and Scientist seek greater understanding rather than starting from understanding devoid of all personal commitment. Michael Polanyi, in his many writings,[5] has more than adequately shown the central and necessary role that faith plays in scientific understanding. Faith, thought of as essential only to theological activity (as an example, Karl Barth's *Church Dogmatics* incorporates in it as a primary principle Anselm's dictum—"faith seeking understanding"), is thus seen to be a basic component of all human creativity.

The ideas developed here are schematically represented in Figure 1 which portrays human creativity envisioned in terms of acts of exploration and discovery. Subsidiary clues and presuppositions are integrated together, one part of reality being focused upon and perceived as a new conceptual or perceptual whole. A new reality-structure is thereby recognized; or, if you like, brought into being.

Isaac Newton's discovery of the law of universal gravitation provides an example of man's creative activity. He first recognized that the behavior of the falling apple is in its motion analogous to

the behavior of the circling planets. Note that he looked only at one aspect of the objects being considered, the common motions; he did not envision a planet as a "big apple" with seeds in it. This would be carrying an analogy much too far. What he then did was to look for a common principle, the pull of gravity, which would provide a unified explanation for both the planet's and the apple's motion. Thus Newton recognized a likeness that was not "seen" before, and this new likeness further unified our understanding of physical reality. In a similiar way, the creative artist composes and arranges musical notes to form likenesses never heard before which thereby provides a greater unity to our auditory experience.

What we have seen is that a key component of man being made in God's image is his ability to create new things. God's central role as the Divine Artist, the Maker of Heaven and Earth, is reflected in man's creative activity. Hence everything we can learn about creativity, human or Divine, will help men to better fulfill their role on earth as God's image bearers. In particular, as pointed out by Dorothy Sayers, the human artist's creative endeavors can teach today's technologists and engineers an insight that is fully in accord with modern ecological understanding and will greatly aid humanity in building a better world of men, nature, and machines:

> "Perhaps the first thing that he (modern man) can learn from the artist is that the only way of mastering one's material is to abandon the whole concept of mastery and co-operate with it in love: whosoever will be a lord of life, let him be its servant. If he tries to wrest life out of its true nature, it will revenge itself in judgement, as the work revenges itself upon the domineering artist."[6]

First is brought to our attention a fact our very materialist, quick-success orientated society has forgotten, an insight long respected by both artist and scientist: love is central to all creative activity (recall the quote from Poincaré). Second we are reminded that man in all his creative efforts must cooperate with nature, not exploit nature; this is the proper meaning of the command in Genesis that man have dominion over all the earth as forcefully pointed out by A.R. Peacocke in the following extended quote.

> ". . .As J. Barr put it: 'The whole framework of Genesis 1 is intended to suggest that man is man when he is in his place within nature. His dominion over nature is given little definition; but, in general, its content is less exploitation and more leadership, a sort of primary liturgical plaee.' Man exercises the 'dominion' that is accorded him under a delegated authority from God who is the Creator of both man and that over which man is given this derived 'dominion', and which independently of man has value to God as his creation. . .so man is created (referring to Genesis 1:26-29, parentheses mine.), not to minister to the Gods as in some Sumerian-Babylonian narratives, but to civilize the earth and this is seen in the context of the history of mankind. The 'dominion' which he is described as being assigned is that of a king. The kingly quality of man is seen in his rule over the animals and in accordance with the concept of kingship in antiquity: 'As lord of his realm, the king is responsible not only for the realm: he is the one who bears and mediates blessings for the realm entrusted to him. Man would fail in his royal office of dominion over the earth were he to exploit the earth's resources to the detriment of the land, plant life, animals, rivers and seas. . .What is decisive is the responsibility of man for the preservation of what he has been entrusted to him; and he can show this responsibility by exercising his royal office of mediator of prosperity and well-being, like the kings of the ancient world.' Although 'dominion' has this kingly reference, it is a caring 'dominion' exercised under the authority of the creator, and so it is a more accurate reflection of the meaning of the Genesis myth to say that it describes man as vicegerent, or steward, or manager, or trustee (as of a property, or a charity) as well as exercising the leadership of a king of creation. He is, in the myth, called to tend the earth and its creatures in responsibility to its Creator. He is accountable. He is responsible."

Today mankind is faced with some basic dilemmas. World population and expectations for material prosperity are rising while, at the same time, humankind is rapidly using up available living space and polluting a finite environment beyond safe limits. At the same time humanity is rapidly depleting the earth's finite store of essential natural resources which supply energy, food, transportation, and shelter needs. Clearly uncontrolled growth must be brought into control so that adequate living space is maintained, finite supplies of natural resources are preserved by recycling, and technologies that pollute the environment are regulated to lower pollutants to acceptable levels. The best way of achieving such controlled growth of technology is to follow the example of the artist by:

1. Learning as much as one can about basic structure and properties of the material being used.
2. Then using this knowledge to cooperate with the natural inner shapes, flows, and stresses of the material rather than forcing the material into a highly stressed an unstable form.

As an example of these principles, a bridge designer specifies concrete, a material strong in compression, for the columns where the loading is compressive. Other members of the bridge that undergo tensile loads are made of steel, strong in tension. And by designing with the flow of stresses in the bridge, avoiding sharp and sudden changes in stress, the bridge designer can minimize the amounts of materials needed for the bridge's construction.

If such a stance is adopted it does not necessarily signify a return to more primitive technologies as many urge. Part of the meaning of man being made in the image of God is that man is a creator and that attribute may be used to glorify God by creating new technological concepts and objects. Such new technologies are initially morally neutral. If their operating characteristics are studied and understood they can be used to benefit both humanity and the environment. For then undesirable characteristics are fully recognized and so can be properly regulated. This is ethically good. On the other hand, if the operating characteristics are not fully understood and such technologies are rushed into use without proper regulation, evil will result. An example from my field, science education, is instructive. The newly developed handheld calculator is of great benefit only when the effect upon the educational process of the quickness and automatic nature of its operations is taken into account. Introduced at the proper stage of a student's career he is spared the drudgery of excessive routine paper-and-pencil calculations and has much more time to study the basic principles of science and engineering that the calculations illustrate. However, if intruduced too early in his career, use of the handheld calculator prevents the student from adequately mastering basic mathematical operations (multiplication and division of numerical expressions involving brackets as an example) and he really does not understand these basic operations. When, in his later years, he is asked to learn advanced mathematics which depends upon a full comprehension of basic mathematical operations he has great difficulty in mastering these new concepts. In this example it is clearly seen that the new technology itself; i.e. the handheld calculator, is not at fault; the improper introduction too early in the student's intellectual development is the source of the trouble. Misuse of a new creation, not the creation's existence, is the source of difficulty.

The reflection of God's creativity in man as shown in the creation of new technologies is, properly understood, something to praise God for as we ask Him for guidance in not allowing human sin to distort its proper use. As Morris Tanenbaum has argued, such creativity is necessary for human survival, more new technology being needed rather than less:

> "Given a broader view of our society's goals, of the obstacles we face, of the means at hand for surmounting them, an unavoidable conclusion emerges: To solve the problems of the 1980s and beyond

will call for more technology (the context of his talk indicates he means new technology)—not less.

It will take more technology—not less—to discover and develop alternate energy sources. It will take more technology—not less—to assure the manageability and livability of our cities and the national development of their infrastructures—transportation, communication, power.

And it will take more technology—not less—to provide all people in all nations with the food and shelter, the health care, the education and economic opportunities they need to become full-fledged productive members of a stable and secure world community."[8]

Conclusion

New Technologies are a result of a human creativity that owes its existence to man bearing God's image. Faith is a central component of all such creativity; the creativity that can bring about beneficial new technologies thrives when embedded in a God-given matrix of basic presuppositions about God, man, and the world. Some basic beliefs, derivable from biblical theology, that will do much to ensure the health of any creative efforts are now listed and discussed. These beliefs summarize and add to arguments heretofore developed.

1. A good God created and continually holds in being a good creation. As physical reality is created it is not Divine and hence it can be studied and experimented with by men.
2. A truly rational God is completely trustworthy, thereby guaranteeing the existence of regular patterns governing created reality; such patterns are capable of being found by rational human inquiry.
3. God is the ultimate source of all beauty and imparts that beauty to physical reality by maintaining unified law structures in even the most complex physical phenomena; God further gives man a mind that can appreciate, comprehend, and love such beauty (another implication of man being made in God's image).

Scripturally there is ample justification for assertion 3; in Psa. 27:4 David wishes to behold the beauty of the Lord, Eccl. 3:11 asserts that God has made everything beautiful in its time, and Isa. 45:18-19 states that God created not a chaos, but a place to be lived in—a cosmos.

Human creativity in its widest context further supports this thesis that beauty is an essential component of all creative efforts. Beauty is commonly associated with the creative activities of artists; but other areas of human creativity are also marked by beauty, modern science being an example. Beauty is an essential component of scientific theory formulation; "notions of elegance and economy, especially as expressed in mathematical form have frequently proved valuable guides to a better understanding of the physical world. It is a recognized technique in elementary particle physics to seek theories which are compact and mathematically beautiful, in the expectation that they will then prove to be the ones realized in nature. This is a striking fact."[9]

I conclude this brief discussion of beauty as one aspect of creativity by mentioning two criteria of beauty that have been proposed to serve as guides in the creation of new scientific formulations, theoretical and experimental. These criteria are, in my opinion, useful aids for creating beauty in all disciplines, technical or artistic.

The first is the criterion of Francis Bacon: "There is no excellent beauty that hath not some strangeness in the proportion!" (Strangeness, in this context, has the meaning 'exceptional to a degree that excites wonderment and surprise!')

The second criterion, as formulated by Heisenberg, is complementary to Bacon's: "Beauty is the proper conformity of the parts to one another and to the whole."[10]

4. God's very nature is love; He has made the universe in such a way that love is central to its well-being. Hence man must seek to work cooperatively and in harmony not only with other human beings but with all physical reality.
5. Man, being made in the image of God, has the capacity, perhaps even a mandate, to create new things. These new creations can be good, just as God's creations are good, if adequate time is taken to properly study their characteristics so that they may be used in ways that minimize harmful effects.

[1]The author is greatly indebted to the insights of Dorothy L. Sayers concerning human and Divine creativity. My introduction to her came in a collection of her essays, *The Whimsical Christian*, Macmillan Publishing Co., Inc., New York, 1978, pp. 93-150.

[2]Sayers, *Ibid.*, p. 114.

[3]Sayers, *Ibid.*, p. 119.

[4]This quote is contained in *Chase, Chance, and Creativity* by James H. Austin, Columbia University Press, New York, 1978, p. 144.

[5]Michael Polanyi's key books are:
a. *Science, Faith, and Society*, The University of Chicago Press, Chicago, 1966.
b. *Personal Knowledge*, Harper Torch books, New York, 1964.
c. *Meaning* with Harry Prosch. The University of Chicago Press, Chicago, 1975.

[6]Sayers, *Op. Cit.*, p. 126.

[7]A.R. Peacocke, *Creation and the World of Science*, Clarendon Press, Oxford, 1979, pp. 281-283.

[8]Taken from an address given by Morris Tanenbaum at the 1980 commencement of New Jersey Institute of Technology. Mr. Tanenbaum is president of New Jersey Bell Telephone Company.

[9]J.C. Polkinghorne, *The Particle Play*, W.H. Freeman and Company Limited, Oxford and San Francisco, 1979, pp. 1-2.

[10]S. Chandrasekhar, "Beauty and the quest for beauty in science", *Aesthetics and Science*, Fermi National Accelerator Laboratory, Batavia, Ill., 1979, p. 82.

W. Jim Neidhardt
Physics Department
New Jersey Institute of Technology
Newark, New Jersey 07102

Einstein, Cosmotheist

On one of the portals of the Riverside Memorial Baptist Church in New York City is an effigy of Albert Einstein. The curious passerby ponders "Was he truly religious? If so, in what sense?" An answer to these questions requires a definition of religion—not an easy task either theoretically or practically. I shall use Paul Tillich's criterion of "ultimate concern"—not unlike Martin Luther's suggestion that God is He whom we love with all our heart and mind and strength and soul. From this viewpoint we shall consider Einstein's own attitude to the universe. First, however, let us glance at a synopsis of his life.

Einstein was 64 when I first met him at home in his role as a consultant to the U.S. Navy Bureau of Ordnance. (I was in charge of its Group on Fundamental Explosives Research.) His childlike

qualities impressed me: his simplicity, sincerity, and honesty—not to mention his amazing physical insights. Upon one occasion, when several of us arrived for a conference, he met us anxiously. It so happened that the Dean of the neighboring theological seminary was going to bring a visitor to meet Einstein—right in the middle of our conference. "Will it take long?" I inquired. "No! The man just wishes to meet me," he replied. "Why not do so?" I suggested. His face lighted up as he assented. During our discussion his secretary Helen Dukas quietly came upstairs and whispered something to him. He wrung his hands anxiously. "What is the trouble?" I inquired. "The man is here!" he admitted. "Why not go down and meet him?" I remarked. "Will that be all right?" he asked apologetically. In a few minutes he returned with a satisfied smile. The ordeal was over. (I could imagine the visiting clergyman telling his congregation with pride about his meeting Einstein.)

Einstein was born at Ulm, Swabia, boasting of the highest cathedral tower in Europe—Luther country. His Jewish parents, Hermann a merchant and Pauline Koch a pianist, were irreligious. When he was one year old, the family moved to Munich, the capital of Catholic Bavaria. The child was certainly not a prodigy; he was exceptionally slow in learning to speak. His first wonder-full experience occurred when he was between 4 and 5. His father showed him a pocket compass. To the child there seemed to be something deeply hidden behind it. (cf. Alfred North Whitehead's surmise that philosophy begins with wonder).

At six Einstein attended an elementary Roman Catholic school (he was the only Jewish child). About the same time he learned to play the violin (later he took piano lessons, too)—a lifelong recreation. At 10 he entered the Luitpold Gymnasium. Two years later he experienced his second memorable wonder—geometry. He was fascinated at the unexpected meeting of the altitudes of a triangle in a point—a fact that could be rigorously "proved." About the same time he received the school's customary religious instruction. What appealed to him most was the ethical teaching of the Old Testament. This paradise, however, soon became lost in his fascination for some popular science books, which were generally irreligious. A little later he became entranced with Mozart's sonatas; Bach became a second favorite.

When Einstein became 15, his parents moved to Milan for business reasons. He was left with his engineer uncle Jakob to complete his schooling—a disaster. His teachers complained that his lack of respect for them had a bad influence upon the students. The Latin teacher predicted that he would never amount to anything. Throughout his life Einstein despised regimentation. He was wont to say that his elementary school teachers were like army sergeants, his gymnasium ones like lieutenants. Discouraged, Einstein pleaded for a 6-month medical leave of absence under the care of his parents. He never returned; he was a drop-out.

In his autobiographical notes at 67, he concluded, "It is, in fact, nothing short of a miracle that the modern method of instruction has not strangled the holy curiosity of inquiry." Despite the abundance of classrooms today there are comparatively few good teachers and even fewer good students.

While at Milan, he took entrance examinations for the Polytechnic Institute of Zurich (PIZ). He failed in biology and modern languages, but did well in mathematics and physics. By attending the Argau school in Aarau Canton he acquired a diploma which admitted him to PIZ at 17. He followed a program for teaching physics and mathematics. He was particularly fascinated by the laboratory work, which brought him into direct contact with nature. His "practical" teacher, however, complained, "Why don't you study medicine, law or philology instead?" Nevertheless, three years later he did receive his PIZ diploma (the average grade on his final exams was B-).

It was not until 23 that he found permanent employment, viz., in the Patent Office at Berne—hardly an encouraging environment for a young physicist. A year later he married a former classmate Mileva Maric, a Greek Orthodox Serbian—an event never approved by his family. (Upon one visit to Serbia she and their two sons joined the Roman Catholic Church.)

At 26 Einstein published three significant papers (on quantum theory, restricted relativity, and Brownian motions), any one of which would have qualified him for a Nobel Prize (actually he did not receive one until 16 years later when he had become famous for relativity—but then for quantum theory). When he was 28, he submitted his relativity paper in conjunction with his application for a teaching position at the University of Berne. It was rejected because of a hand-written requirement.

At 32 Einstein received appointment as Ordinary Professor of Theoretical Physics at the German University of Prague. He had to indicate his religious affiliation in accordance with an edict of Emperor Franz Joseph I; he used a customary notation, "Mosaic." Three years later he was elected to the Royal Prussian Academy of Science at Berlin with the title of Professor at the University of Berlin (he could lecture, or not, as he pleased). (One of his sponsors apologized that his paper on quantum theory might have missed the target.) His wife did not accompany him. After five years separation they became divorced. He married his Berlin second cousin Elsa, a widow with two daughters. When he was 54, he joined the Institute for Advanced Study at Princeton—his second wife died three years later. Einstein retired at 66. (I was invited to a symposium in his honor when he was 70). He died at 76. Throughout his life he had an aversion to professional science. His raison d' etre was to be an amateur, free to pursue "truth" for its own sake. (He would have preferred to earn his living by other means than scientific research, if need be—say, as a cobbler or a teacher.)

When I looked for the first time (1945) at the bombed Frankfurt Museum, I pondered its inscription "towering o'er the wrecks of time": "*Das Wahre, Das Gute, Das Schöne.*" Had Einstein been inspired by this motto? He confessed, "My ideals which illumined me and filled me with the joy of life are beauty, goodness, and truth." When he became a public figure after the observational confirmation (1919) of the three predictions of his general relativity, he felt obligated to use his influence to further his social concerns. His basic belief was that "the foundation of all human values is morality." He mused, "I came to love charity and the love of one's fellow beings above everything else." His two major concerns were Zionism and pacifism.

Einstein supported the Zionist movement, particularly the new University of Jerusalem. He himself, however, was not a Zionist. He did not subscribe to their zeal for nationalism and for orthodoxy.

As for pacifism, he insisted, "Life is sacred, that is to say, it is the supreme value to which all values are subordinate." He was vehemently opposed to "every kind of cruelty and hatred." War, to him, was mechanized cruelty—he abhorred the military system. Nevertheless, he would not endorse the conscientious objectors, whom he regarded as helping the other side, which was equally bad. (Having registered as a C.O., I myself came to a similar conclusion in 1941, and changed midstream.) Hitler, however, seemed to present a more irrational specter so that he was willing to accept Lt. Stephen Brunauer's invitation to become a Bureau of Ordnance consultant in 1943. Meanwhile, in July 1939 and March 1940, at the instigation of the Hungarian physicists Leo Szilard and Eugene Wigner, he urged President Franklin D. Roosevelt to support the production of an atomic bomb, which he feared the Germans would develop (it so happened they rejected the idea).

Einstein's third letter (April 1945), pleading for not using the bomb, remained unopened on Roosevelt's desk on the day of his death. Just prior to Einstein's own death on April 18th, 1955, he signed the philosophical mathematician Bertrand Russell's manifesto urging nations to find peaceful means to settle matters of dispute between them.

Before discussing Einstein's religion we must look at his relevant philosophy of physics, beginning with the role of phenomena as he envisaged it.

We begin with the philosopher Auguste Comte, who in 1830 argued that theory should be judged only by positive experience—subsequently termed positivism. The philosophical physicist Ernst Mach in 1886 insisted further that every physical statement should relate only observable quantities—called a positivistic requirement. He was especially critical of Newton's abstract concepts of absolute space and time. Einstein's own recognition that simultaneity of two events is different for observers in relative motion revolutionized the very concepts of space and time. He, however, did not subscribe to Mach's stipulation; he was content if the theoretical conclusions agreed with observable phenomena. Thinking per se, he believed, would not yield knowledge about the actual universe, as postulated by the mathematical philosopher René Descartes. As he remarked, "The universe of ideas is just as little independent of the nature of our experience as clothes are of the nature of the human body."

Let us turn now to the role of the human mind. We begin with the philosopher David Hume, who in 1748 emphasized that the principle of casuality is a non sequitur of observation. In 1781 the critical philosopher Immanuel Kant insisted that the rules of thinking are a prerequisite for understanding phenomena. For example, he insisted upon the necessity of Euclidean geometry—negated later by the development of equally valid non-Euclidean geometries. In 1912 the mathematical physicist Henri Poincaré postulated that scientific concepts are free creations of the mind, their usefulness being determined by their agreement with observations. Logical consistency, to be sure, was requisite—hence the idea of logical positivism espoused by the Vienna Circle in the 1920's—later termed more aptly logical empiricism. Although Einstein was indebted to all the above, he was not strictly a logical empiricist inasmuch as he allowed for some metaphysical concepts not derivable from sensory raw data.

Einstein had a passion to understand nature, which he believed to be real and rational, but a riddle. He confessed that "the most incomprehensible thing about the world is that it is comprehensible." Over the fireplace in the Fine Hall Common Room at Princeton University is inscribed a saying of Einstein: "*Raffiniert ist der Herr Gott, aber boshaft ist Er nicht*" ("The Lord God is subtle, but He is not mischievous"). He believed that the road to understanding nature is illuminated by mathematical simplicity inherent in nature's unity. (The concept of simplicity is not itself simple.) The apparent beauty, however, was always to be subservient to the latent truth, i.e., mathematical elegance is secondary to physical content. The method is not fancy free like that of a novelist, but rather like that of a person seeking a unique word for a crossword puzzle. Einstein was dedicated to discovering the truth lurking in nature. About his work there was an aura of religion.

Einstein's speculation about religion had its roots in the pantheism of the Jewish philosopher Baruch Spinoza, who regarded the universe as a mixture of mind and matter—but not a Cartesian dualism. He identified the order of the universe with the will of its inherent God (so-called). Einstein admitted, "My conception of God is an emotional conviction of a superior intelligence manifest in the material world." In the spirit of Psalm 139 he regarded God as immanent—but not transcendent. He did not "believe in a God who cares for the well-being and the moral doings of human beings."

In his Herbert Spencer Lecture at Oxford (1933) Einstein spoke of "something ineffable about the real, something occasionally described as myterious and awe-inspiring." The fact that the method of investigation turns out to be true in the empirical sense he regarded as "a property of our world, an empirical fact, a hard fact." This mystical attitude toward the harmony of universal law is what I call cosmotheism. The mathematical physicist Philipp Frank, who succeeded Einstein at Prague in 1912, noted, "It is the scientist in the field of natual science, especially in the field of mathematical physics, who has this mystical feeling"—what can be regarded as the center of true religiousness. Einstein himself called it cosmic religion. He insisted, "In this sense, and in this sense only, I belong to the ranks of devoutly religious men." It is not surprising that the chemist Walther Nernst saw in him the model for the young Johannes Kepler in the *Redemption of Tycho Brahe* by Max Brod, the German author of Prague. Christians will identify him with the scribe whom Jesus described as not being far from the kingdom of God.

Alongside the National Academy of Sciences in Washington, D.C., is the centennial memorial of Einstein's birth. Regardless of the artistic merit of the "mud-packing" style of the sculptor Robert Berks, his portayal of Einstein is wanting in spiritual appreciation. The lolling, gorilla-like, Gargantuan figure gazing down at a miniature star-studded sky is not the Einstein I knew. He would have been looking up humbly, in rapturous amazement at the harmony of law revealing everywhere a superior intelligence. He was a cosmotheist.

Raymond J. Seeger
National Science Foundation (ret.)
Washington, D.C.

The second in a series of notes on religious scientists.

Redefining "Wisdom"

"Wisdom" is one of those slippery words in English. It is difficult to define precisely, yet common to most people's vocabulary and usage. "Wisdom" (in the Hebrew, *hokmah*) is also a complex, yet frequent Old Testament term. In its noun, adjective, or verb forms it is used over three hundred times. For both the ancient Hebrew and the modern English-speaking individual, "wisdom's" range of overlapping and at time contradictory meanings extends from craftiness to sagacity, from erudition to common sense.

There are, however, important differences in meaning and nuance between Old Testament "wisdom" and modern conceptions of the term. In particular, three common characteristics of the word "wisdom" in our society contain aspects of a biblically derived definition, but also serve to cloud over more fundamental meanings of the biblical term.

Contemporary Characteristics of "Wisdom"

For some modern Westerners, "wisdom" is associated with *erudition*, with great learning, with a high degree of knowledge. Particularly for those lacking in formal education, wisdom is

thought to be discovered in the classroom and the academy. The counsel of teachers and pastors with specialized learning in one area is often sought out by students and parishioners, for example, because it is assumed that such educated people are generally wise.

For others, particularly those who have witnessed the lack of insight characteristic of many who have acquired strong theoretical knowledge in one area, "wisdom" has taken on a second association, namely, that of *common sense*. Here wisdom is thought to be a native quality of the mind, capable of cultivation but largely inborn. Viewed from this perspective, one's immigrant grandmother might well be wiser than one's physics professor.

Whether learned or innate, whether expressed in academic journal or folk music, modern "wisdom" possesses a third characteristic—its cerebral orientation. Wisdom is primarily a *quality of the mind*. Most modern-day people would not think of applying the term "wisdom" to describe the skill of a plumber, or even a painter. Thinkers, not doers, are wise. If a plumber is also judged to be wise, it is for reasons other than his skill in his vocation.

Now there is a sense in which these contemporary characteristics of "wisdom" are consistent with the use of the term "wisdom" in the Old Testament. Solomon's wisdom, for example, is in part his *intellectual brilliance* and *encyclopedic knowledge*. It is said in the fourth chapter of I Kings that Solomon uttered three thousand proverbs and composed songs. But the thrust of this biblical assessment of Solomon as being "wise" centers on his ability as a "scientist". Solomon could catalogue trees, animals, birds, reptiles and fish (I Kgs. 4:33). It is this sense of "wisdom" as learning that lies behind God's use of the term in Chapter 38 of Job as well. It is also this academic wisdom that comes under fire in the Book of Ecclesiastes.

Scripture rarely considers anything that man possesses as innate. Everything is from God, and this is true of wisdom too. But it is interesting to note that "wisdom" does at times have a certain naturalness, or commonness associated with it. In Scripture even the animals are sometimes judged wise. That is, they have a certain survival instinct, a certain *common sense* approach toward life that the absent-minded professor lacks. The writer of Proverbs 30:24-28 has this in mind when he labels the ant, the badger, the locusts and the lizard "exceedingly wise" (cf., Pr. 6:6f). The use of the word "wisdom" to mean basic "common sense" seems also the intention of Hosea in his caustic judgment on Israel. He chides, "The pangs of childbirth come for him, but he is an unwise son; for now he does not present himself at the mouth of the womb" (Hos. 13:13). Israel, Hosea charges, lacks wisdom; she doesn't even know what the fetus does naturally without prompting.

Contemporary discussion of the origin of Old Testament Wisdom Literature has debated whether ancient wisdom's provenance was the court or the clan, the school of the family. Did wisdom sayings develop naturally out of the life of the people, or were they the product of the educated counselors of the king? The answer need not be either/or. Increasingly, scholars are recognizing that wisdom came from both sources. Wisdom is the accumulated observations of past generations of common folk. It is also that legacy which Solomon and his court wise men fostered. Here is the same dual orientation for wisdom that even its definition betrays. Seen from one perspective, wisdom is the property of the "cultured;" seen from another, wisdom is the possession of the "common."

In both cases, however, wisdom has to do largely with the mind. As the Preacher states in Ecclesiastes: "I applied my mind to seek and to search out by wisdom all that is done under heaven" (1:13). He repeats the association a few verses later ("I applied my mind to know wisdom"), although he concludes, "For in much wisdom is much vexation, and he who increases knowledge increases sorrow" (Ec. 1:18).

Old Testament Characteristics of "Wisdom"

The ancient Hebraic term for wisdom shares in common with its contemporary English equivalent an orientation toward the mind, whether this be an inborn quality or one that is acquired. Yet we miss the fuller meaning of the Old Testament term "wisdom" if we rest content here. For such a description largely reinforces various of our cultural prejudices, while overlooking more inclusive biblical perspectives. Wisdom must be understood as more than the academic competence our society values so highly; it has to do in its oldest layer of meaning with any form of *skill*, or know-how. Similarly, wisdom, while resident in humankind and animals, is never the creature's independent possession; however much we might think of ourselves as having "come-of-age", it is always a gift from God the Creator. It is *sacred*. Lastly, wisdom, while having to do with the mind, has equally to do with other aspects of our personhood less valued today. In particular, wisdom has a strong *ethical* cast.

Such broadened perspectives on "wisdom" seem foreign to much of modern thinking. To be once again appreciated, therefore, they need to be considered in some detail.

Wisdom" as Know-how

During the eighteenth century, musicians such as Bach, Handel and Haydn were known first of all as craftsmen with mastery over their instruments. Their art was viewed primarily as technical proficiency in subjecting sounds to a valid ordering. Out of the abundance of possibilities for sound, these composers produced that which was beautiful, not ugly—creative, not chaotic. Such an understanding of the musician would have appealed to the Old Testament person, and the term used to describe the successful practitioner might well have been "wise". For "wisdom" in its most elemental usage meant know-how, or skill, or special ability.

Perhaps the most explicit example of this meaning of "wisdom" is in Yahweh's words to Moses in Exodus 31 concerning the designer of the tabernacle:

> The Lord said to Moses, "See, I have called by name Bez'alel. . .and I have filled him with the Spirit of God, with ability (literally "*hokmah*", i.e., "wisdom") and intelligence, with knowledge and all craftsmanship, to devise artistic designs, to work in gold, silver, and bronze, in cutting stones for setting, and in carving wood, for work in every craft" (Ex. 31:1-5).

Good artisans are said to possess wisdom (cf., Ex. 35:35). Similarly, the skills of farmers (Is. 28:24-29), merchants (Ezek. 28:4-5), professional mourners (Jer. 9:17), builders (Pr. 24:3), soldiers (Pr. 21:22), astrologers (Is. 47:9-13), knife-sharpeners (Ec. 10:10), sailors (Ps. 107:23-27; Ezek. 27:8), scribes (Jer. 8:8-9) and kings (II Chr. 1:10; Is. 10:13) are labeled "wisdom", *hokmah*. Such skills can be turned to doing evil (Jer. 4:22) or to misusing the Law (Jer. 8:8), but the fact that it is a skill, the fact that it helps to order reality, sets it apart as wisdom. Experience is helpful (Job 12:12); training can provide insight (Pr. 1:3); observation is instructive (Pr. 6:6). But central to "wisdom" is the result, the ability to steer one's way skillfully through life (Pr. 1:5).

Contemporary Old Testament wisdom scholarship, influenced by the use of the term *ma'at* in the Egyptian wisdom writings, has often interpreted wisdom as a search for, or an uncovering of, a world order established by God (cf. Koch, Schmid, Gese, VonRad). But such a notion of wisdom is too static. The wise person is not just one who recognizes an order. He is the one skilled at ordering experience. It is in this sense that later in Israel's history

God, too, is described as wise (Is. 31:2; Dan. 2:20). God is the master craftsman (cf., Ps. 8:5; Pr. 3:19). It is he who is at work in the world, shaping it according to his design as the writers of Proverbs (Pr. 8:22-31), Ecclesiastes (Ec. 3:17; 7:23-24) and Job (Job. 28:23-27) all realize.

"Wisdom" as Divine

Not only is God wise, creating and shaping according to his sovereign will and design, but people are wise only as God chooses to bestow wisdom upon them. It is the Lord who gives wisdom (Pr. 2:6). This was the secret of Solomon's success (1 Kgs. 3:12). This was the source of the writer of Ecclesiastes' frustration (Ec. 2:26). Wisdom is personified in the well known eighth chapter of Proverbs, as well as in the extra-canonical books of Sirach (Sir. 24) and the Wisdom of Solomon (Wis. 7). The exact meaning of this personification has been hotly debated. Has an hypostatization of wisdom taken place? That is, has wisdom been deified and given an independent status? It seems not. The personification of wisdom in Proverbs 8 is a rhetorical device aimed at communicating more effectively an attribute of God's nature. It is God's wisdom that is offered to us as a life-companion (Pr. 4:6-9; 7:4). It is God's wisdom that was at work in creation (Pr. 8:22f).

There are three primary implications that derive from the fact that wisdom is viewed in the Old Testament as being with and from God. First, wisdom is *inaccessible* to us by our efforts alone. Thus, modesty and humility are our proper garb. Job recognizes this after encountering God's wisdom in the voice of the whirlwind: ". . .I have uttered what I did not understand, things too wonderful for me, which I did not know" (Job 42:3). The writer of Proverbs asserts this fact as he observes: "No wisdom, no understanding, no counsel can avail against the Lord" (Pr. 21:30). Given the mystery of God's wisdom, it profits nothing to be wise in one's own eyes (Pr. 3:7; 28:26).

Instead, and secondly, wisdom is a gift from the Lord (Pr. 2:6), and wisdom's access is limited to the "fear of the Lord" (Job 28:28; Ps. 111:10; Pr. 9:10). David Hubbard has pointed out that in the Old Testament there are a cluster of terms used to describe our relationship with God: "trust", "love", "fear", "obey", "know". The words overlap and bleed into one another. In the Wisdom Literature, the most frequently used of these terms are "fear" and "know". If we are to be wise, we must first fear God and know Him. This was Solomon's key (I Kgs. 3:12, 28); so, too, Joseph's (Gen. 41:38f.) and Daniel's (Dan. 1:17-20). To fear is not to cower in terror, but to take God's revelation of himself in creation and redemption with utmost seriousness, to yield to its authority, and to follow through with its implications. To fear is to love, which is to know, which is to trust, which is to obey. Here, alone, is the path to wisdom.

Thirdly, "wisdom," being from God, has a special authority over us. It invites life and threatens death. Roland Murphy has correctly pointed out that the *kerygma*, the message, of the Book of Proverbs is life itself. Here is the good news that wisdom offers. "The teaching of the wise" is said to be a "fountain of life" (Pr. 13:14). Proverbs 8:32-36 states this idea even more clearly. Wisdom is speaking and she says:

> . . .he who finds me finds life
> and obtains favor from the Lord;
> but he who misses me injures himself;
> all who hate me love death.
> (Pr. 8:35-36; cf., 10:17; 5:6)

"Wisdom" as Ethical

In the Old Testament God's justice (his righteousness) and his love (his mercy) connect and infect each other (cf., Is. 11:2ff.; Jer. 9:24; Hos. 10:12). This is true also in the New Testament as Luther so forcefully discovered while meditating on Romans 1:16-17. And as it is with God, so, too, with his children. We are "to do justice, and to love kindness, and to walk humbly with. . .God" (Mic. 6:8). Now in like manner, "wisdom" is not an isolated word in Scripture, but is associated repeatedly with "righteousness" and "justice". It is "the mouth of the righteous" which "utters wisdom" (Ps. 37:30; cf. Deut. 16:19). As does wisdom, so justice leads to life (Pr. 10:16). "He who is steadfast in righteousness shall live" (Pr. 11:19).

The Law commands right living; wisdom commends it. For only a context of righteousness allows wisdom to spring forth (Pr. 10:31). Avoid loose women; they will cost you your life by turning you from wisdom (Pr. 9:13-18; 7:21-23). Wealth and beauty can similarly corrupt wisdom (Ez. 28:12-17). Control your speech, for a perverse tongue will be cut off (Pr. 10:31; cf., 19:9). If you wish to be wise, do not be a drunkard or glutton (Pr. 23:19-21).

Wisdom's ongoing ethical concern led her followers in the centuries just prior to the birth of the Messiah to equate wisdom not simply with law, with rules of conduct, but with the Law. To be wise and to obey the Torah were judged one and the same. The pathway to this conclusion was a gradual one. Wisdom's focus had been on God as Creator, and right conduct had been discerned from experience in creation. The Law's focus had been on God as Redeemer, as he revealed to his people the shape of authentic faith and life. But since Yahweh, the Creator and Redeemer, was one, since both wisdom and Law concerned themselves with righteous action, and since God's reward for both wisdom and obedience to the Law was life (cf., Deut. 30:15-20 and Pr. 8:32-36), it was only a matter of time before these parallel revelations from God merged. With Moses, obedience to the Law had been labeled "wisdom" (Deut. 4:6). Now, with Ben Sirach, wisdom is equated with "the Law which Moses commanded us" (Sirach 24:23).

Conclusions

Contemporary people seek wisdom, yet they often do so unmindful of its larger Old Testament meaning. The result is that they tend to seek it in the educational system narrowly conceived, not in the general pursuit of excellence inside and outside the classroom. They tend to seek it in the secular, not in the religious, even if they are Christians. They seek it as a quality of the mind, not as a stance of the whole person. And as a consequence, many are finding the quality of modern life compromised in various ways.

Viewing wisdom as the possession of the academy, our society has, for example, overvalued the college degree with a resultant loss of respect for the trades. It is small wonder that job dissatisfaction with its toll on both product and person is high. No one desires to be thought of as possessing lesser importance or worth. The fundamental definition of "wisdom" in the Old Testament as skill or ability should point us toward new possibilities for finding meaning in all of life's vocations. Why are finish-carpenters or watch-repairmen a dying breed? Why are American-made products increasingly shabby? Could it be that wisdom within God's wonderful mosaic of humankind has been obscured in order to celebrate the wisdom of man's academic achievements alone?

Again, those who view wisdom as something we are born with often overlook the fact that wisdom is a gift from God. Going back to Kant and beyond, Western culture has tended to divorce science from religion, wisdom from sentiment, the mind from the heart. The result has been the apotheosis of wisdom. That is, wisdom has been made an end in itself, and the implications stemming from this are proving disastrous. Our current explosion of knowledge threatens to overwhelm us. Our man-made launch is traveling full speed ahead across uncharted seas. But are we really moving ahead? We suspect our boat lacks a rudder to guide us. We

follow our nursery rhymes and proceed to "jump over the moon," only to question its meaning and the resultant cost. We know much as a society, but life's larger goals and purposes continue to prove evasive. As the writer of Eccleiastes observed long ago, "For in much wisdom (of this kind) is much vexation, and he who increases knowledge increases sorrow" (Ec. 1:18). Without a recognition that wisdom is from God and for God, joy will continue to prove elusive (cf., Ec. 2:24-26).

Finally, the newspapers are filled today with debate over the ethical implications of our work. Is there such a thing as "pure" research? Can we as a society afford not to discipline our intellectual potential along strongly humanistic lines? What of genetic research? What of nuclear energy? The list could be extended. What is needed today is a recovery of wisdom's locus in prudent, ethical action. Right conduct leads to wisdom, and wisdom to righteous action.

Wisdom's task, as well as its context, is the nourishment of human kind. Here, surely, is the meaning of wisdom's metaphor as "the tree of life":

> Happy is the man who finds wisdom. . .
> She is more precious than jewels. . .Her
> ways are ways of pleasantness, and all her
> paths are peace. She is a tree of life
> to those who lay hold of her; those who
> hold her fast are called happy.
>
> (Pr. 3:13-18)

Robert K. Johnston
Visiting Professor of Theology and Old Testament
New College, Berkeley
Berkeley, California 94704

Behaviorism in the Sanctuary

The "normal church service" cannot, of course, be universally described, let alone be psychologically analyzed. Services vary widely from church to church, even within a single doctrinal or denominational group. However, several practices can be analyzed which are quite widespread in various churches.

It is far too easy to overgeneralize the psychological implications of a particular practice. In some contexts an action can be beneficial and healthy, while in another context it may prove to be contrary to the basic goals of Christianity. Likewise, reinforcement may be found to vary widely—what reinforces one group may be seen as totally inappropriate and even punishment to another.

The individual should exercise caution in applying these concepts to one's own church or group, since what is described in this article may refer to extreme and unusual church behaviors. A particular action performed occasionally may be perfectly healthy, while that same action may become harmful if done repeatedly. As psychologists have known for years, unhealthy behavior is often normal behavior taken to an extreme or practiced in an inappropriate situation.

Pulpit Manipulation?

Most preachers desire a positive response to their preaching. Change is a crucial concern at this point—if the congregation members are not in some way different as they leave church, most pastors would concede that time and effort were wasted.

Some in the area of psychology have suggested that this desire for change has resulted in some preachers going so far as to use manipulation and even brainwashing techniques. In an early book, *Search for Reality,* Gary Collins wrote of the group pressure of some church services. In behavioral terms, the preacher might speak convincingly of potential punishments (hell or condemnation) for those who have not participated in certain behaviors (accepting Christ or coming forward). Combined with a highly-charged presentation using emotion-provoking stories during altar calls, persons may respond without being fully conscious of why they respond. They come forward, but for the wrong reason.

Collins has pointed out an area of real concern to those who believe that Christian ethics must go with Christian preaching. The right of people to make their decisions about Christ without coercion from the preacher or anyone else must be respected. Decisions can be influenced by a speaker, but the preacher should permit a decision contrary to his views. For a person to make a decision without real alternatives freely considered is manipulation, not real commitment.

Manipulation taken to an extreme is called brainwashing. While totalitarian brainwashing has been given a great deal of attention in the press, an overlooked aspect of brainwashing is that decisions are often temporary. When the person is allowed to leave the brainwashing environment with its punishments and reinforcers, beliefs often disappear within a fairly short time. This is primarily because such ideas are no longer socially reinforced. The return to conventional values is usually prompt and permanent. Similarly, many "converts" in religious services quickly backslide and lose interest in church functions and goals. Attendance may or may not continue, but attitudes become more like those before "conversion". (Collins, 1969)

We must be careful not to condemn all altar calls or persuasion techniques. Christians *must* influence others and reach our world effectively, but without compromising ethical matters. There comes a time in scriptural terms to shake the dust off of our feet and go elsewhere (Matthew 10:14) rather than going to more and more extreme methods to get an outward response that might not be real conversion. Even in the spiritual realm, the end (the appearance of conversion by coming forward) does not justify the means (manipulative high pressure preaching). Such manipulation is characteristic of cults (see Enroth, 1977).

Influence without manipulation is possible and desired. We must be able to give a reasonable and effective defense for our beliefs (I Peter 3:15). But when the decision is not fully the result of responsible and conscious thinking of the convert, ethical concerns have been compromised, and the likelihood of long-term attitude change is diminished. *Some* are changed and truly converted under high pressure, but many others soon lose their beliefs or even lose respect for Christianity because of the manipulation involved. True Christian commitment is always voluntary, never forced.

While commitment is possible during highly emotional service, a negative by-product *may* be produced. Since initial commitment is paired with emotional response, the person may come to associate emotions with spirituality. Repeated emotional conversions further provide such associations in the forms of classical conditioning: emotional behavior is conditioned with spiritual attitudes and feelings. Testimonies may be given accompanied by emotional display, thereby further conditioning emotional behavior with spirituality. Eventually the person may come to believe himself or herself less spiritual or even not a Christian because of lags in emotional feelings. This tendency is too common to be ignored, and it

can be directly traced to such conditioning in church services. Even though we may state that emotions are not needed, intense altar services and emotional testimonies communicate otherwise; people tend to be more affected by what they see than what they hear talked about.

Invitational hymns may also be classically conditioned with behavioral responses. I have personally experienced the situation where such songs as "Just as I Am" have resulted in a desire to go forward in a service. Yet, upon careful and open consideration of my spiritual condition, I realized there was no reason to go forward. This tendency has been confirmed by others I have spoken with. The desire to go forward was most likely not prompted by the Holy Spirit, but rather was a classically conditioned response. Perhaps this helps explain why some people will repeatedly go forward at an invitation without a clear understanding of why they did so. This is particularly true with young children, but also occurs with others.

In some church services, the evangelist may say "if just one more person will come forward, we'll sing another verse." This may be placing a great deal of pressure upon those in attendance to come forward, and for the wrong reason—to be sure others won't miss heaven. The potential punishment implied, as well as the clear specification of desired behaviors and subsequent reinforcements (other persons becoming Christians) results in the behavior of coming forward. The thinking of potential reinforcers and punishments may occur on an unconscious level, sometimes referred to as coverence.

Unfortunate classical conditioning of children often takes place in church. *Christianity Today*, (Dobbins, 1975) states that children come to associate fear and pain with the church service. While a pastor might desire that fear and pain be associated with hell and sin, these emotional responses can easily generalize to the church surroundings and church-related persons (particularly the pastor). The writer of the *Christianity Today* article suggests that this may be a factor in the number of children who leave the church before adulthood. Do some extreme sermons on the last days and hell produce counterproductive long-term conditioning?

Too often children come to associate church with pain in other ways also. The limits of the child's attention span and need for visual aids clash with the typical sermon and many Sunday School situations. Children often are punished or scolded in church when they cannot meet the impossible demands of parents and teachers for prolonged attention. Such punishments come to be associated with the church and religion in general, and sermons specifically. Another common aversive for the child is teaching and curriculum that are developmentally inappropriate (see Ballard & Fleck, 1975).

In contrast to the above, the *Christianity Today* article states:

> Centuries ago Solomon observed, "Train up a child in the way he should go: and when he is old, he will not depart from it" (Proverbs 22:6). The symbolic Hebrew language used in this passage pictures a mother cow helping her newborn calf survive by licking the calf's lips with milk, thereby creating in the calf a taste for milk. The obvious implication is that if one is to help a child to have a healthy appreciation of spiritual matters when he is older, it is necessary to create in him a taste for spiritual things when he is young.

Positive reinforcement without coercion is a much better motivator for spiritual living than is punishment and threat of punishment, in nearly all cases.

Positive Functions of the Church Service

Having focused on a number of possible negatives in some churches, we must also give our attention to the positive values of church services from a behavioral view. For example, people are often attracted by "friendly churches". But this generalized remark can be broken down in behavioral terms which can produce a more complete understanding of church effectiveness.

Reinforcement may be present in the form of peers who influence the individual outside of the church as well. Griffin in his book *The Mind Changers* relates this influence in his conversion. A youth group that was attractive and enthusiastic about spiritual matters influenced him more and more until on a retreat he gave his heart to Christ. Manipulation was not involved, but rather he came to identify with the young group and their influence finally helped him make the step. Reinforcing approximations of behavior is termed "shaping".

On the church level, this suggests that youth should have an active part in services if the church desires to reach and influence young people. Peer identification would be more likely, and the underlying peer group reinforcement would achieve increased attendance and participation. One church with which this writer is familiar regularly has their young people lead the evening service. The sermons are not profound, but they are enthusiastic and the church has large youth audiences.

This principle holds true not only for youth, but also for other segments of the church congregation. Participation by a variety of persons should produce more group reinforcement for spiritual acitivity. The myth that biblical churches are to be controlled by members of a "spiritual elite" is happily being dispelled, encouraged by such books as *The Problem of Wineskins*.

Other reinforcements for church attendance are common in "friendly churches". A handshake and friendly conversation can be reinforcing to the lonely person. Testimonies in services add to group cohesion and internalizing of beliefs. Reinforcements during and after testimonies—in the form of Amens and other responses—will tend to result in repetition of the testimony behavior.

Music can be a reinforcing form of behavior. The uniting of enthusiastic voices can be both exhilarating and provide a strong desire for repetition of the experience. This may, in part, explain the strong interest in lively songs in some churches.

Reinforcement among church members is a key to Christian fellowship. Behind the concern in the Scriptures for Christians meeting together, is the tendency for groups to verbally and nonverbally reinforce individual members. Because of the strong influence a group can have on individuals, the regular assembling results in a stronger doctrinal and behavioral consensus. In a Bible-oriented group, the group would therefore be more likely to conform to biblical ideals. This is focused upon in the verse, "Be not conformed to this world, but be transformed by the renewing of your mind" (renewal through individual and group study of the Word)—Rom. 12:2.

Several other portions of the Bible speak to the influences upon individuals through the fellowship of believers. Ephesians 4:32 emphasizes being kind and compassionate to fellow believers—strong reinforcers for group membership and participation. Reinforcement principles appear to be behind the thought in Hebrews 10:24-25: "Let us consider how we may spur one another on toward love and good deeds. Let us not give up meeting together, as some are in the habit of doing, but let us encourage one another. . ."

Churches also influence persons through modeling. In church, as well as in other areas of life, we learn best by example. While ultimately Christ must be our example, we are undoubtedly influenced by those in church also. Paul focused upon the need for

adequate models by stating "In everything show them an example by doing what is good" (Titus 2:7), and even suggested his own life as a suitable model (I Thessalonians 1:6-7 and II Timothy 3:10). All too often, churches unknowingly model bickering or complacency instead of the kingdom of God.

An extremely important aspect of the influence in churches is that of reinforcing *desired* behavior. Giving Amens to false doctrines in a testimony may undercut a firm biblical base for the church. While the Bible states that those weak in some areas should be accepted rather than argued with (Romans 14:1, 14:19, 15:1), reinforcement should be given which will best help move the person toward biblical views, perhaps through shaping techniques. Pastors should also beware of inadvertantly punishing in churches, such as asking for hands of those who did not invite others to church, punishing attendance and truth telling by embarrassment.

Pastors are not immune to the influences of reinforcement and punishment, of course. The congregation gives its approval or disapproval through eye contact and other forms of attention, as well as verbal reinforcement both during and after the service. The most direct form is the custom in some churches of saying such phrases as "Amen", "Hallelujah", and similar statements. While such expressions are probably considered by church people to be directed to God, they undoubtedly also have an effect on what the pastor or evangelist talks about. The icy stare, talking to others, or gazing out the window likewise has a punishing influence (or at least is not reinforcing).

From a behavioral view, positive feedback on a sermon or other pastoral activities encourages those behaviors. On the other hand, punishment may not be effective in causing change *unless* the pastor recognizes viable alternatives. Criticism of the sermon may not result in modification of that behavior unless the pastor becomes aware of other alternatives which he sees as worthwhile, for which he can be suitable reinforced.

Reinforcement certainly influences pastors in unconscious ways. The story is told of a teacher who was unknowingly shaped into lecturing without notes by his students. When the teacher spoke from notes, students looked out the window, never paid attention, and talked with one another. When the teacher gave side comments or told stories, students gave their full attention to his every word. Needless to say, this system of combined reinforcement and punishment quickly resulted in the teacher telling stories and giving side comments more and more, at least until he found out about the scheme! (Dobson, 1970)

Behavioral influences are just as real in the church as in the school classroom. Pastors, as well as Sunday school teachers and laymen, are influenced by contingencies regardless of whether anyone is aware of them. Hopefully, by being more aware of environmental influences, individuals can choose those influences which are most desireable in building the Kingdom of God.

Ballard, S. and Fleck, J. "The Teaching of Religious Concepts". *Journal of Psychology and Theology*, Summer, 1975.

Collins, Gary. *Search for Reality: Psychology and the Christian*. Santa Ana, Calif.: Vision House Pub., 1969.

Dobbins, Richard, "Too Much Too Soon". *Christianity Today*, Oct. 24, 1975.

Dobson, James. *Dare to Discipline*. Wheaton, Ill.: Tyndale House, 1970.

Enroth, Ronald. *Youth, Brainwashing, and the Extremist Cults*. Grand Rapids, Mich.: Zondervan Publishing House, 1977.

Griffin, Em. *The Mind Changers*. Wheaton, Ill.: Tyndale House, 1976.

Oates, Wayne. *The Psychology of Religion*. Waco, Texas: Word Books 1973.

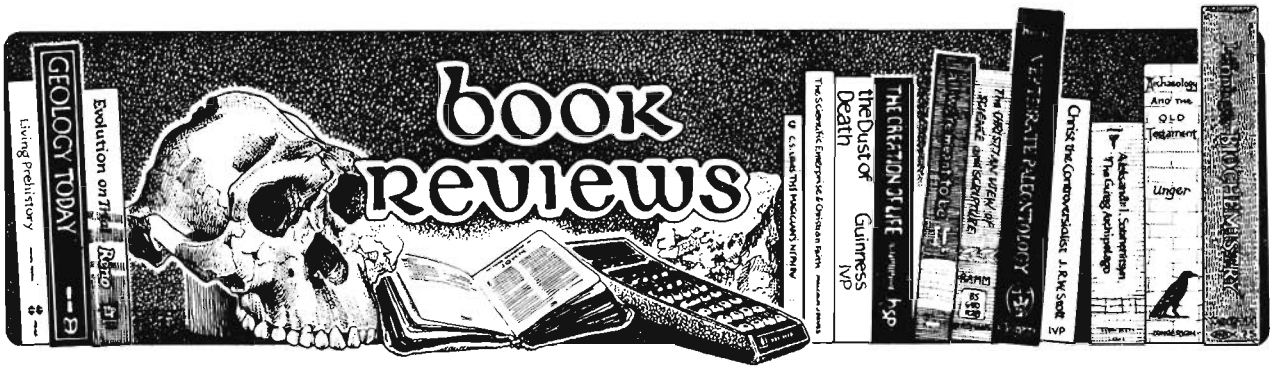
Synder, Howard. *The Problem of Wineskins*. Downers Grove, Ill.: Inter-Varsity Press, 1975.

Donald Ratcliff
Gallipolis Developmental Center
Gallipolis, Ohio 45631

There are now about 50,000 warheads stockpiled worldwide; most of these are more powerful than the two that together killed one-quarter million people in Japan. All studies continue to show that if a large fraction of these were used in war, several hundred million people would die and immense suffering would follow. Such studies make a variety of assumptions about targets, shelter, or effectiveness of evacuation. Yet they tend to consider only the "prompt" effects of nuclear weapons-blast and early radiation, combined with radioactive fallout. The casualties induced by delayed consequences—the effect of fire, food shortage, absence or maldistribution of medical care, societal breakdown, epidemics—are not included; they are omitted as "too difficult to calculate." Some of the long-range effects—ecological imbalances, depletion of the ozone layer, synergistic effects, and the genetic burdens—have been studied, but it is generally agreed that the unknown exceeds the known.

How, in the face of these horrendous facts, have a series of "rational" decisions led to the status quo? What reasoning has led the superpowers to conclude that their nuclear weapons stockpiles and at times even their supplies of weapons-grade nuclear raw materials are insufficient?

Wolfgang K. H. Panofsky
"Science, Technology and the Arms Race," *Physics Today*, June 1981, p. 41.



THE HUMAN PSYCHE, by John C. Eccles, Springer International, Berlin, 1980, 279 pp. Dm44.

THE MYSTERIOUS MATTER OF MIND, by Arthur C. Custance, Christian Free University Curriculum, Zondervan, Grand Rapids, 1980, 105 pp., $2.95.

The Human Psyche contains the 1979 Gifford Lectures delivered by Sir John Eccles at the University of Edinburgh. The lectures are an extension of those delivered as the first series of Gifford Lectures in 1978, and published as *The Human Mystery* (Springer, 1979). A review of this latter work appeared in the March 1980 issue of the *Journal of the American Scientific Affiliation*, and much I wrote at that time applies with equal force to the present work. If anything, however, Eccles is more explicit about the dualism he envisages between brain and mind, while he openly acknowledges his indebtedness to Christianity.

Eccles is at pains to "restore to human persons a belief in their spiritual nature superimposed on their material body and brain" (p. IX). For him, this can be accomplished (perhaps, only accomplished) via the philosophical position of dualist-interactionism.

Chapter 1 is both a resumé of his fundamental position, based as it is on Popper's three-world philosophy, and a rebuff of criticisms of this position. The former of these is a useful summary, but the response to his critics is cursory and insubstantial. Radical materialism, panpsychism, epiphenomenalism and the identity theory are each dismissed in a few paragraphs. The difficulty is that his refutations of these rival hypotheses are referred to repeatedly later in the book, as if the arguments on which they are based are thoroughly reasoned through. Unfortunately, they are not.

Eccles is at pains to elaborate a structural basis for brain-mind interaction. As outlined in Chapter 2, this is provided by the subdivision of the brain's neocortex into columns (modules), each column consisting of a few thousand nerve cells. This is a fascinating chapter and most instructive for neurobiologists. Eccles' speculations about ways in which the columns may operate and interact are equally fascinating, and also highly creative. The speculations become questionable however, when a distinct self-conscious mind is introduced, necessitating liaison of this mind with the cortical columns and demanding its accommodation within neurobiological theory. This, of course, is crucial to dualistic interactionism.

But how, we may ask, is it possible to speak meaningfully of an ascientific concept interacting with a physical entity? What does it mean to say that: "the self-conscious mind can scan the activity of each module of the liaison brain . . . ." (p. 46), or that: "the self-conscious mind acts in modifying slightly some of these modules. . . ." (p. 47)? Eccles nowhere brooches this issue, and yet at the end of each chapter he uses terminology of this nature. This mixture of philosophy and neuroscience is tantalizing to the sceptic, and yet it seems to be the only means by which Eccles can solve "the impossible task of deriving a mental world out of a material world of neuronal circuits" (p. 49). For Eccles, mental and material worlds exist, the mental world controlling the material—that is, the mind controlling the brain.

Chapters on sensory perception, electrical properties of the brain, the emotions, levels of consciousness, creativity, and altruism and aggression are all strong on neurobiology but weak on philosophy. Remarkably little attention is paid to a detailed outworking of dualism in these areas. In some instances, the distinct impression is given of a God-of-the-gaps approach. Unsolved neurobiological problems are open to a dualistic interpretation, with the mind providing the final link in some piece of neuronal machinery. All too readily the mind assumes anthropomorphic characteristics, with its ready-made answers to immensely complex, and perhaps baffling, neuronal questions.

Eccles readily equates non-dualistic hypotheses with materialistic (in the philosophical sene) ones. When the proponents of such materialistic theories have no explanations of specific phenomena, they are condemned. After all, dualistic interactionism—by its very nature—always has answers: the mind can invariably be resorted to as the cause of an observed set of data.

It is sad to have to make such assessments of Eccles' major attempt at a brain-mind synthesis. It deserves better, and yet because Eccles never meets the philosophical issues head-on, it is doomed to failure. He tackles far too wide a compass, with the result that he has to depend on far too many unsubstantiated and wistful longings. It may be encouraging to be told that "human beings are born with the

potentiality to become fine human persons living in harmony with their fellow beings" and that the writings of Morris and Ardrey are "subversive" (p. 212), but strong arguments are required to substantiate such statements. Eccles also demonstrates a tendency to rebut arguments by quoting contrary opinion. In this way he disposes of Monod's views expressed in *Chance and Necessity*. Again however, solid argumentation would have been more convincing.

Far too much is expected of dualist-interactionism, and yet Eccles revels in this. For him, it solves not only many neurobiological dilemmas, but also provides rationales for the uniqueness of individuals (unique individuality comes from the infused soul", p. 240), freedom of the will, and immortality of the soul. Finally, he reveals that he is "not antithetic to Christianity, in which I am a believer" (p. 252). It is unfortunate though, that he sees just two options: dualism-interactionism with its expression of a religious hope, and materialism with its lack of any eternal hope.

For Eccles, terms such as mind, soul and psyche are interchangeable, and together constitute one of the two essential substances of the world—alongside the material entities of brain and body. Arthur C. Custance in *The Mysterious Matter of Mind*, written for Probe Ministries, goes along with Eccles and other dualists in this distinction. Custance's book appears to be designed to promulgate the explicit dualism of Eccles and other neurobiologists, such as Sir Charles Sherrington and Wilder Penfield. Incidentally, Custance inaccurately states the Eccles' work was carried out in the British Isles; it should have been Australia!

The views of these writers are clearly stated by Custance, whose book constitutes a relatively easy introduction to their thought. Unfortunately, his aim is to propagate dualism as exemplified by these writers, rather than critically assess it. Implicit throughout the book therefore, is the assumption that dualism is the position-of-choice for Christians. No attempt is made even to state this, let alone justify it, until the epilogue. Even here though it is inadequately dealt with; many unequivocal statements about the dual (body-soul) nature of man are not substantiated, but are simply put forward as the view of the biblical writers (p. 90). When biblical evidence is given (p. 93) it is again not worked through.

Custance's book demonstrates yet again the difficulties of fusing scientific and philosophical approaches. Custance is overly critical of scientific endeavor, because it fails to take account of concepts, such as mind, derived from outside science. Nonetheless, he is forced to rely on data about the brain gained, naturally enough, using strictly scientific procedures. This is a problem for dualist-interactionists, one I would like to see tackled in such a book as this.

In dealing with Eccles' position, Custance deals at length with the readiness potential described by Kornhuber. It may be significant that while Eccles placed greatest stress on these data in *The Self and its Brain* (1977) and *The Human Mystery* (1979), he is more concerned with cortical columns in *The Human Psyche* (1980). Perhaps this is a reflection of how rapidly interpretations have to change when adopting a dualistic-interactionist approach.

Christians should ask themselves some serious questions as they confront this debate. If there is a "mind" in the sense in which dualist-interactionists use the term, what do we know about it? How do we set about describing and understanding it? Our knowledge of the brain is increasing rapidly, but mind seems as elusive and vague as ever. It is not good enough for Christians to assume that the mind controls the brain, without looking hard at the Old and New Testament frameworks for describing human nature. Perhaps our frantic efforts to bolster up classic dualism with contemporary scientific data are in vain; accurate biblical exegesis may be more to the point.

Reviewed by D. Gareth Jones, Associate Professor, Department of Anatomy and Human Biology, The University of Western Australia, Nedlands, Australia.

WHAT ARE THEY SAYING ABOUT CREATION? by Zachary Hayes, O.F.M. Paulist Press, New York, 1980. 120 pp. $2.95.

"The current experience of environmental problems," says the author, "has only served to underscore the need for a solid, contemporary theology of creation. . . .". This professor of theology at the Catholic Theological Union in Chicago develops his thesis in this book which is one of a series with other volumes such as *What Are They Saying About The Resurrection* and *What Are They Saying About Death And Christian Hope?*

He believes that concordism was found wanting in relating science and Genesis except by some fundamentalists, nor does he feel science and theology are unrelated disciplines for ". . .the major Western theological tradition operates on assumptions which imply that science has some relevance for theology."

"As often as the Old Testament gives expression to its religious faith in terms of the concrete world, this will take the form of the pre-scientific, mythical understanding available to it from the surrounding culture." The theological message of the Old Testament is that "God creates for the sake of the final fulfillment accomplished in Christ." "God creates not in order to gain something for himself but for the gain of his creatures."

The author expresses his ideas in such clear and forceful language that I can do him the best service by quoting some of his leading ideas, hoping you will get his book to appreciate the skillful elaboration of his evidence whether you agree with his convictions or not.

"The notion of *creation from nothing* is an attempt to express the real ground of the Christian confidence in life." He believes "theology emerges from religious experience and revelation, not from scientific proof."

Hayes accepts evolution as God's method of creation. "Contrary to the fears of many Christians, the concept of evolution as such does not eliminate God since it does not pretend to speak of primary causality but only of secondary causality." The human race did not need to ascend from one pair; but the story of the origin of sin in Genesis gives us the basis for believing in the universality of sin. "Theology speaks of sin at two distinct but related levels. First, individual actions and dispositions may be designated as sins." But even more basic than that is an underlying, existential condition called sin. It is the state of being in which human persons find themselves to be isolated from the holy." In considering New Testament theology he writes, "The object of Paul's teaching is not the biological descent of all humans from Adam, nor some primordial state of grace. Positively, Paul's principal concern is to affirm our solidarity in the grace of Christ who is the cause of redemption from all human beings." He also summarizes the teaching of the Council of Trent.

Regarding eschatology he states "Jesus Christ lives really with God. . . .We also have a future with God. And it is in that future that the mystery of our existence as created beings is ultimately vindicated." "We are to manage the world efficiently with respect and with the love which we have because of Christ's presence." "The ground or source of the creative process is a limitless mystery of creative love."

Read one of his conclusions, "Theology need not fear science nor tremble before the power of reason. Rather both theology and science need to stand in awe in the face of the mystery of God to which the world points."

Reviewed by Russell L. Mixter, Professor of Zoology Emeritus, Wheaton College, Wheaton, Illinois 60187.

WHATEVER HAPPENED TO EDEN? by John R. Sheaffer and Raymond H. Brand. Tyndale House Publishers, Wheaton, Il. 1980. Paperback, 151 pp. $4.95.

Both authors have cooperated in endeavors to improve the environment in consulting, research, and political campaigning, hence practical solutions as well as current problems are considered.

Following a preview of the anticipated advancements in technology and biology, the authors survey the technology-environment clash and the energy crisis both from their own viewpoints and that of many other authorities from earlier times to the recent days. For example, they deal with "breathing without dirty, invisible pollution: radiation, and policing pollution". But they also emphasize the bounty nature has provided in air, sunlight, plants and soil. "Solar energy is the great unharvested power for the future. Its supply is unlimited, it is environmentally clean and it is increasingly competitive with fossil fuel costs." Sewage can be "waste to wealth."

The human community should use technology as a humanitarian tool. "If recognition of the value and interrelationships of flowers, birds, and people is the mark of an ecologist, Jesus Christ was an early model." ". . . .Jesus taught the principle of efficient management of resources."

Because of nonrenewable power-going, and nuclear power-coming or going (?), the writers advocate solar energy and Brand follows his own advice in giving a vivid example of how he has adapted his own home to its use. Sheaffer received a top engineering award for directing the Muskegon County (Michigan) land treatment sewage development, which is explained along with ones at Lubbock, Texas, Northglenn, Colorado, and other efficient examples of energy from waste such as Mt. Trashmore.

This valuable book concludes with problems of world population and food, and managing our resources. "By joining the earth revolution, the life and health you save will be your own today and your children's legacy tomorrow." This book will aid you in this good cause.

Reviewed by Russell L. Mixter, Professor of Zoology Emeritus, Wheaton College, Wheaton, Illinois 60187.

BIO-BABEL: CAN WE SURVIVE THE NEW BIOLOGY? by Allen R. Utke. John Knox Press, Atlanta. 1978. 247 pp. $11.95.

"The biological revolution carries great potential danger for society. . ." writes Allen R. Utke, Associate Professor of Chemistry at the University of Wisconsin at Oshkosh. He recommends national polls and global cooperation to slow down the present pace of research, with science regulating itself and legal power exerted as influence guided by group pressure. During a moratorium there can be conferences to discuss research.

But these recommendations follow a fascinating account of accomplishment and possibilities of research in reproduction, physical and mental modification, the prolongment of life and creation of life.

Reproduction studies consider fertility control, abortion, control of sexual desire, artificial insemination, choice of sex in offspring, artificial inovulation, cloning, and baby factories.

Under physical modification, Professor Utke elaborates on prospects and results of transplanting, regenerating, or artificially making body parts, genetic engineering, artificially making body parts, genetic engineering, artificial and synthetic plants and animals, man-animal, man-plant, and plant-animal chimeras. The author is acquainted with many of the attempts that have been made and vividly states what results have been accomplished or are anticipated.

Rather than list the numerous studies under the various major topics, let me summarize just one in the author's study of the electrical control of the brain. ". . .There have been definite indications that movement, affection, aggression, pleasure, anxiety, fear, violent behavior, and their opposites can be aroused and to at least some degree controlled through the electrical stimulation of the brain." It can prevent pain and even produce some sight by stimulating the visual cortex. "Eventually the researchers hope to perfect a functional artificial eye in the form of a tiny television camera mounted in the eye socket of a blind person."

Spectacular results and plans are clearly related by the author and sources for further information on these are offered. Utke also lists the dates when prospects for success may occur, the "*possible* arbitrary extrapolation into our biological future." He considers all this a modern Tower of Babel because "once again we are at work building massive monuments to our own glory." We have tended both to worship science and be afraid of its accomplishments. The author has many questions about both bio-blessings and bio-dangers. For example, "Certainly people are healthier and have more things than ever before, but have these facts made us better men?" "Would the ability to choose the sex of one's offspring result in an overall societal preference for one sex over the other?" He states that recently "a shift in preference toward females is actually underway."

Many benefits are listed such as preventing the extinction of rare and endangered species, eliminating genetic diseases, producing bacteria that could clear up oil spills, ". . .increasing the proportion of people in the maturing, mellowing, 'settling down' period of life" which would lead to a "more stable, more enjoyable society."

Also bio-dangers are noted with a multitude of questions asked on all the phases of the biological revolution. Anyone who wishes to write on such topics will profit by consulting this volume with its balanced and perceptive analysis of our scientific explorations. We all need an answer to "what are the responsibilities of the religious person and organized religion in the serious and even crucial questions which have now been raised?" and the author urges us to do it now.

A postscript adds recent developments which occurred after the author had written his valuable discussion. "Most books are at least somewhat out-of-date by the time they appear. . ." but I highly recommend this treatise as an excellent view of our exciting new biology.

Reviewed by Russell L. Mixter, Professor Emeritus of Zoology, Wheaton College, Wheaton, Illinois 60187.

WHERE DO WE STAND? by Harry Blamires, Servant Books, 1980. 158 pp. $7.95. Ann Arbor, Michigan.

Enthusiasts of Blamires' earlier work, *The Christian Mind* should welcome this examination of the Christian's position in the modern world. Concerned that Christians find "the right footing for action", Blamires seeks to draw "the dividing line between faithful Christian witness and apostasy."

Blamires identifies secularism as the critical problem facing the church. Readers in this country may wince at the suggestion that Christianity does not differ from secularism in many of its social concerns. We are inclined to think of secularism as external to the church and without influence on it. But there is considerable support for Blamires' claim that secularism can penetrate the church as readily as the church can Christianize society.

It is this intermingling of Christianity and secularism which is in tension today and threatens to lead the Christian into error. Unless he is aware of this problem, the Christian may readily accept the cliches of secular thought offered by our mass culture. In short, Blamires claims the Christian seeks the same set of rules for life as the secularist but without developing a necessary and uniquely Christian state of mind.

Blamires shares with C. S. Lewis, his mentor, the belief that the "deep Christian" is especially sensitive to divine grace and authority. He develops an intellectual, moral, and spiritual point of view characteristic of his Christian profession. Any lack of commitment to these three viewpoints produces the "unbelieving Christian" whose worldliness is characterized by a rejection of the objective for the subjective and the rational for the emotional. At this point, the Christian seeks to cover this-worldly values with a veneer of spirituality.

Blamires considers idolatry to be a natural result of the worldliness of our age. But he does not limit idolatry to such expressions of materialism as alcohol, autos, and gambling. He includes those modern myths supporting distorted notions of freedom and progress among those other idolatries threatening us in our polytheistic and superstitious age.

If this is where we stand, what are we to do? Blamires argues for an emphasis on the essential quality of creation as God's way of ordering a rational, objective world. The problem of contemporary irrationality is an expression of our ignorance of this form of the world. But it is not enough to understand creation only on the subjective level. What is needed is a perception of the objective order "built into the doctrine of a meaningful universe purposely made by God". This view of the world is crucial if the Christian is to stand in the world and withstand it.

It is quite likely that many of Blamires' supporters will find him too conservative in this book. Unlike much of the superficial conservatism rampant today, however, his arguments avoid simple conclusions. Instead of offering the reader another set of "how to" recipes, he does a greater service by skillfully describing "what is."

This is a necessary sequel to the abstract treatment of the Christian in Blamires' earlier work. Worldliness in this age must be identified if the Christian Mind is to be exercised in

the world. Blamires provides a perceptive and incisive analysis of this world and sharpens the Christian's awareness of his responsibility in it.

Reviewed by Russell Heddendorf, Geneva College, Beaver Falls, Pennsylania.

THE MESSIAHSHIP OF JESUS: *What Jews and Jewish Christians Say and How Jewish Attitudes are Changing*, by Arthur W. Kac (Compilator), Moody Press, Chicago, 1980, 351 pages. $9.95 (paperback).

The former editor of the Saturday Review, Norman Cousins, has suggested that "it might be salutory if the members of the first Christian family were referred to in terms of their origins, i.e., 'The Jewess, Mary', or 'Joseph, the Jew' or 'Jesus, the Jew'." If this were done, it would soon become very obvious that *all* first Christians were Jews, that in the immediately following decades most Christians were Jews and that even many priests who served in the Holy Temple at Jerusalem became Christians (Acts 6:7b). Alas, too few churches and individual believers today are willing to proclaim the gospel of Jesus Christ as the power of God unto salvation to the Jew. This reviewer was almost 20 years old before anyone on two continents suggested to him that he, a Jew, can be saved, that he ought to be saved, that he must be saved. Six months later, after being prayed for, preached to and read to from the Bible, he became a newborn child of God.

This most illuminating book deserves to be reviewed in the *Journal ASA* for at least two reasons. The compiler, a renowned Baltimore radiologist, has been an ASA member for many years. Many readers of this *Journal* work in Academe and have many close friends and colleagues who are of the Jewish faith and who deserve an intelligent answer when they inquire of us for the reason of the hope and joy in us. This book will provide much background information; it is a compendium of what influence Christ has exerted over Jewish hearts. It explains what the Messiahship of Jesus really means and it quotes many sayings of erudite Jews and Jewish Christians about Him. Indeed not everyone in intellectual Jewish circles is ignorant about this person nor rejects outright all that we hold dear about Him.

To the writer Sholem Asch Jesus "is the outstanding personality of all times, all history, both as Son of God and as Son of Man. . .every act and word of Jesus has value for all of us, wherever we are. He became the light of the world." Martin Buber confesses: "From my youth onwards I have found in Jesus my great brother. . .my own fraternally open relationship to him has grown even stronger and clearer". Albert Einstein, when asked whether he accepts the historical existence of Jesus, replied: "Unquestionably! No one can read the Gospels without feeling the actual presence of Jesus. His personality pulsates in every word. No myth is filled with such life." Benjamin Disraeli, Prime Minister under Queen Victoria and a Jewish Christian states: "There is one fact which none can contest. Christians may continue to persecute Jews, and Jews may persist in disbelieving Christians, but who can deny that Jesus of Nazareth, the Incarnate Son of the Most High God, is the eternal glory of the Jewish race?"

The 69 brief chapters of this book are, like Gaul, divided into three parts: The changing Jewish Attitude Toward Jesus, An Analysis of Present-Day Jewish Views of Jesus, and Statements by Jewish Christians. It makes interesting reading and contains a goldmine of solid biblical material which will make the reader a better informed Christian. It may also give some of us a burden to witness to both Jew and Gentile about our matchless Saviour. Highly recommended reading!

Reviewed by A. Kurt Weiss, Professor and Vice-Head, Department of Physiology and Biophysics, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma.

THE EDGE OF CONTINGENCY: FRENCH CATHOLIC REACTION TO SCIENTIFIC CHANGE FROM DARWIN TO DUHEM by Harry W. Paul. 213 pp., bibl., index. Gainesville, Florida: University Presses of Florida, 1979. $15.00

THE POST-DARWINIAN CONTROVERSIES: A STUDY OF THE PROTESTANT STRUGGLE TO COME TO TERMS WITH DARWIN IN GREAT BRITAIN AND AMERICA, 1870-1900 by James R. Moore. xi + 502 pp., bibl., index. Cambridge and New York: Cambridge University Press, 1979. $39.50, cloth; $19.50, paperback.

The recent explosion of Darwiniana, although a bit overdone in some respects, has been generally a very good thing for the historiography of science. The newly available notebooks and letters are certainly valuable, and the new secondary literature conforms to a higher standard of scholarship than that of older works. Just a generation ago, for example, Loren Eiseley (*Darwin's Century, Evolution and the Men Who Discovered It*) saw Darwin as little more than a synthesizer of other ideas—just the right man in the right place at the right time—and Gertrude Himmelfarb (*Darwin and the Darwinian Revolution*) made Darwin an anti-hero of the type Arthur Koestler made of Galileo in *The Sleepwalkers*, blaming him for the worst excesses of Herbert Spencer and implying that Darwinian evolution is really no more correct than geocentric astronomy. Today, however, one can look to such scholars as Michael Ruse (*The Darwinian Revolution, Science Red in Tooth and Claw*) for a much fairer analysis of Darwinian theory and a more accurate assessment of his achievement, and to Howard E. Gruber (*Darwin on Man*) for an excellent monograph on the birth of an idea. Unfortunately, however, a lack of

discernment is evident in Gruber's treatment of natural theology; he lumps togther various points of view to form an inadequately representative whole. Neal C. Gillespie (*Charles Darwin and the Problem of Creation*) offers a much more sensitive handling of the theological problems posed by transmutation and natural selection, although he misinterprets Darwin's own religious views and overestimates the signifigance he attached to them.

The two present volumes, which exhibit the same solid scholarship found in much of the recent literature, are probably the best case studies of evolution and religion to be written in a long time; considering the authors, this is not surprising. Professor of History at the University of Florida, Harry W. Paul (Columbia Ph.D., 1962) is well known as an authority on French science and Catholic intellectual history. A contributor to *Isis*, the *Journal of the History of Ideas*, the *Catholic Historical Review* and other fine journals, Paul has written another fine monograph, *The Sorcerer's Apprentice: The French Scientist's Image of German Science, 1840-1919*. James R. Moore, a graduate of Trinity Evangelical Divinity School (M.Div., 1972) and the University of Manchester (Ph.D. in Ecclesiastical History, 1975), has not yet published much scholarly material, but what he has written consistently displays a meticulous attention to his sources, a trait undoubtedly acquired through the influence of John Warwick Montgomery. An early example of his work appeared in this *Journal* in September 1970; *Christian Scholar's Review* published his exhaustive bibliography on evolution and Christianity in 1975. He is currently a Lecturer in the History of Science and Technology at the Open University.

As his title indicates, Paul concentrates on French Catholic scientists and theologians from 1859-1914, with only a few exceptions (such as St. George Jackson Mivart and Canon Dorlodot, both Englishmen). Indeed, every single entry in his bibliography is a French publication; even works by Darwin, Huxley, Wallace, and Draper are listed by their Parisian editions. References to English sources are found only in the notes. Few secondary works dealing with the same area are mentioned, because few exist—Paul's book is a pioneering effort. Moore is interested in much the same period in Britain and America, although his efforts are directed at Protestant thought with only an occasional Catholic (one is Mivart) appearing in the discussion. Unlike Paul's book, Moore's study has had scores of predecessors—but he is acutely aware of this, explicitly defining the scope of his work in terms of four weaknesses he perceives in the existing literature: the lack of a trans-Atlantic perspective, the use of too few primary sources, too little study of works written after 1880, and too little regard for the history of evolutionary thought after Darwin. These deficiencies are corrected with a vengeance; the fifty-eight page bibliography contains, in Moore's own words, "the fullest available inventory of literature dealing with science and religion in the later nineteenth century and with the post-Darwinian controversies in particular." (p. 401) Taken together, then, these two books constitute the most extensive treatment to date of the Christian response to evolution prior to World War I. For all their similarities, however, they are very different books, and those differences are now explored.

The classical Christian world view after the time of Aquinas asserted that both science and religion were capable of discovering eternal verities; since nature and the bible were both revelations of God's wisdom, power, and majesty, the two pursuits of theology and natural philosophy could be uncritically intermingled. The metaphysics of religion—or, more precisely, the metaphysics of Catholic scholasticism—laid the foundation for the work of science, which in turn yielded truths that "proved" the veracity of Scripture. Underlying this facade of unity, however, was the dangerous, tacit assumption that scientific truth was unchanging, for only a static science could be linked eternally to a static theology. Thus, until "the symbiosis of religion and science characteristic of the West was, for all practical purposes at least, ended in the nineteenth century, any shift in science inevitably involved a crisis in religion." (p. 28) The end of this symbiosis is the theme of Paul's book.

In a rambling opening chapter, Paul introduces the idea of contingency as formulated in the 1870's by Lachelier and Boutroux: since the ultimate essence of things is unknowable, science cannot achieve certainty. Thus scientific theories are not absolute truths or logical necessities, but contingent products of the human mind. From the title, one might expect this idea to have a prominent place in the argument, yet it appears *per se* only very sparingly. It is not so much Lachelier and Boutroux that Paul wants to follow, but the transformation of Catholic thought in response to changing scientific ideas. Thus he devotes the next two chapters to the debate over evolution, an episode which "showed more clearly than anything since Copernicus the damage that could be done to religion by mixing theology and science." (p. 24) Because Catholics had adopted the fixity of species as an element of doctrine as well as a scientific fact, it could not be given up without theological upheaval. Therefore it was defended as an incontrovertible fact of science and used to deny the evolution of species by most of the older generation of Catholic intellectuals, who could not see the fundamental problem

> because they, like most scientists, conceived of science as a set of eternal truths, comparable to Holy Writ in the religious sphere, rather than as a set of paradigms that could be jettisoned or substantially modified once their usefulness had been outlived. (p. 62)

Paul then traces the gradual acceptance of evolution as a *scientific* hypothesis divorced from a materialistic metaphysics. By 1888, Jean d'Estienne argued for the acceptance of evolution because of its *utility*, not its certainty or truth, and in good time many Catholics acquiesced (although *man* was still seen by most as a special creation). After this, Paul explores three specific responses to the growing realization that scientific theories, however well established, can never be taken as absolute truth: Albert de Lapparent, Pierre Duhem, and the neo-Thomists, devoting a chapter to each. An equivocator, Lapparent pushed for a sort of "mitigated contingency" (my term), stressing the history of science as a tale of uncertainty and change, hence undermining the use of science against the faith, while at the same time he saw science as headed toward unity and clarity (proving the existence of a created order) and used scientific knowledge to defend religion. Duhem, a "modern

believer," divorced scientific theories from theological doctrines, preserving the autonomy of both, but shattering all attempts to use science as either an attack on or a defense of theology. Nevertheless, he, too, saw apologetic value in the *history* of science, which he interpreted as an ever-increasing realization of the rule of order in nature. His solution was unacceptable to the neo-Thomists, who sought to restore unity by reviving the metaphysics of Aristotle and Aquinas, purged of its medieval excesses. Others, like Pierre Teilhard de Chardin, sought harmony in a new mysticism. But as Paul concludes,

> For those unable to accept the Thomist *Tao* or unlucky enough to be immune from mystical infection, there remains the more conventional view of the irreducible dualism of science and religion. (p.194)

James R. Moore agrees with much of Paul's argument. In his chapter on "Christian Anti-Darwinism: the realm of certainty and fixity," he points out that the *Origin of Species* explicitly challenged the idea that science could yield certain knowledge:

> the book set forth natural selection, not as a theory for which absolute proof had been obtained, or even might be obtained, but merely as the most probable explanation of the greatest number of facts relating to the origin of species. (p. 195)

It was just this sort of reasoning that Darwin's opponents could not accept. Committed Baconians, they endorsed the fixity of species as an eternal truth, verifiable every day from common experience, and in agreement with Genesis. More importantly, the fixity of species was a natural consequence of the essentialistic philosophy of nature which so many Christians automatically assumed.

Although there are certainly other points of agreement between the two books, too many to enumerate here, at a fundamental level they are very different accounts. Where Paul is looking for major changes—one might even say discontinuities—in Catholic attitudes toward the nature of science and its relation to religion, Moore examines the Protestant side of the post-Darwinian controversies in order to offer "an interpretation which shows the deeper continuities." (p. 13) It is common knowledge that the "warfare" interpretation of the history of science/religion interactions, brought to its height a century ago by John William Draper and Andrew Dickson White, has many serious problems, but no one has ever attacked it as vigorously or as thoroughly before. His first four chapters —about one hundred pages—are, in essence, an historiographical essay on the distortions and misconceptians arising out of the habitual use of the military metaphor over the years. From the lives of Draper and White, Moore concludes that warfare thinking tells us more about those two men than it does about the debates over evolution. Rather than a conflict of scientists vs. theologians, he finds scientists vs. their fellow scientists; instead of two "warring camps," he emphasizes divisions within the ranks of science itself; against the notion of violent antagonism, he stresses the honest disagreements among friends who stayed friendly.

> In each of its major implications the military metaphor perverts historical understanding with violence and inhumanity. . . .Henceforth interpretations of the post-Darwinian controversies must be non-violent and humane. (p. 99f)

The only conflict that Moore does acknowledge took place *within the minds of individuals*. His aim

> is not to furnish psychological evidence of a 'Darwinian revolution' but, on the contrary, to qualify this interpretation by showing how largely the crisis arose and was resolved within the framework of established religious beliefs. (p. 13)

After a brief but very fine (and very useful) four chapter summary of the scientific debate over Darwinism and its various evolutionary alternatives, Moore turns to the works of twenty-eight men who considered the implications of Darwinism for their Christian faith. He divides them into three groups: eight "Christian Anti-Darwinians," mentioned above, who rejected Darwinism primarily for scientific and methodological reasons; sixteen "Christian Darwinists" who baptized Lamarckian evolution (but not evolution by natural selection) with their liberal theological persuasions to produce a romantic philosophy of inevitable progress; and four "Christian Darwinians," orthodox believers who fully accepted orthodox Darwinism without giving up their theological persuasions. In this he finds

> what may well be the central and regulative paradox of the post-Darwinian controversies: namely, that it was only those who maintained a distinctly orthodox theology who could embrace Darwinism; liberals were unable to accept it. Christian Darwinism was a phenomenon of orthodoxy, Christian Darwinisticism, on the whole, an expression of liberalism. The correlation between Darwinism and othodoxy was not inverse but direct. (p. 303)

To follow up this conclusion Moore delves into the reasons *why* various Christians reacted in the ways in which they did. For this he relies heavily on Leon Festinger's theory of cognitive dissonance, which states that dissonance reduction must involve either a change in one of the dissonant elements or a change in their relationship by the addition of new elements which dilute or destroy the dissonance. For many conservative believers, dissonance reduction was easy; since there were sound scientific and philosophical problems with any form of evolutionary theory, they simply rejected them all. Theological liberals, who wanted to adopt the latest ideas, could do so only by watering down natural selection with strong doses of Lamarckism; it might be noted that most nineteenth century scientists, whether Christians or not, did the same thing! A few conservative believers, however, were able "to dilute the dissonance arising from the conflict of teleology and natural selection, and so to reconcile the central doctrine of Darwinism with their faith." (p. 336) As Calvinists, the four Christian Darwinians—James Iverach, Aubrey Lackington Moore, Asa Gray, and George Frederick Wright (who was, ironically enough, one of the founding fathers of Fundamentalism)—grounded the process of evolution in the sovereignty of God. Though man in his finite knowledge might not see the full purpose of every turn in nature, nor could he discover the causes of variations, the Calvinist could (like his namesake) "ascribe all things to the 'directly upholding and governing hand of God,' even those events which seemed independent of or irreconcilable with divine purposes." Chance and providence, secondary and primary causes were certainly hard to reconcile, but no more difficult than free will and predestination; in a word, Darwinism posed no *new* problems to Reformed theology.

In the final analysis, then, those Christians with the theological resources of the Calvinist tradition were able to accept a full-blown, unadulterated Darwinism. Most people will no doubt find that conclusion surprising, if not startling. The present controversy over the teaching of evolution in the public schools has convinced most people, whether Christian or not, that a genuinely biblical faith is utterly incompatible with modern biology. But to those who have read Bernard Ramm's *The Christian View of Science and Scripture*, Moore's point sounds familiar. In his preface, Ramm speaks of a "noble tradition" of nineteenth century Christians who took "great care to learn the facts of science and Scripture." He then notes sadly that

> the noble tradition which was in ascendancy in the closing years of the nineteenth century has not been the major tradition in evangelicalism in the twentieth century. A narrow bibliolatry, the product not of faith but of fear, buried the noble tradition. . . . It is our wish to call evangelicalism back to the noble tradition of the closing years of the nineteenth century. (p. 8f)

One cannot help but feel that Moore is saying much the same thing. Fundamentalists will probably reject what is said, and others may dismiss it as apologetics; such responses would be equally unfortunate, for Moore has given us nothing other than a fresh perspective, a sound argument, and a thoroughly researched collection of facts. In a word, he has written good history.

Although *The Edge of Contingency* and *The Post-Darwinian Controversies* are both excellent studies of the relationship between science and religion in the nineteenth century, they will not be equally useful to the general reader. If only one is to be read, Moore's book is a better choice. His argument is much easier to follow, at least partically because Paul's chapters on Darwinism tend to lead the reader away from the wider issues he intends to pursue. Moore's book covers ground that is probably more familiar to the average American Christian and it is stylistically clearer and less tiresome—Paul really *must* avoid such terms as "Procrustean bed," "quixotic and Sisyphean task," and, worst of all, "the Coryphaeus of the Thomist revival." Above all, *The Post-Darwinian Controversies* is a better choice because it is a better book and a more important book, perhaps the most important yet written on the subject of evolution and Christianity.

Reviewed by Edward B. Davis, Department of History and Philosophy of Science, Indiana University, Bloomington, Indiana 47405.

SCIENCE AND RELIGION IN AMERICA: 1800-1860, by Herbert Hovenkamp, Philadelphia, Pa.: University of Pennsylvania Press, 1978, 273 pages.

For those who tend to think of the relationship between religion and science only in terms of the last one hundred years, Herbert Hovenkamp's *Science and Religion in America 1800-1860*, is a welcome corrective. This impressive, well written study reveals the intellectual climate of the sixty years prior to Darwin's *The Origin of the Species*. What Hovenkamp finds is an interesting variation on the story of the sorcerer's apprentice. The thesis of the book is that evangelical Christianity enthusiastically embraced science in 1800 as an ally in establishing orthodoxy only to find by 1860 that science had become a dangerous enemy.

The major reason for the initial embrace was American Protestatism's adoption of Scottish realism as a guiding philosophy. This movement, represented by men such as Thomas Reid was a reaction to the scepticism of Locke, Hume and Berkeley. The Scottish realists sought to preserve the possibility of empirical knowledge of an objective external world. This created a favorable attitude toward the search for empirical evidence of the truth of Christianity. Christian writers saw both Scripture and nature as domains where one could find facts that pointed to God. In a sense, the lab report became just another avenue of God's revelation to man.

Hovenkamp has done a thorough review of the philosophical, theological and scientific literature of the period to develop his ideas. Much of his work involved close study of the various literary and scholarly reviews from the early 1800's which are relatively inaccessible to most people. Hence, his book is invaluable in giving us insight into the intellectual life of America from 1800 to 1860.

The book begins with a survey of theological and philosophical thought and moves toward the scientific ideas in the last half of the book. There are chapters devoted to Scottish realism, the debate over miracles, natural theology, the search for an over-arching unitary law of nature, and biblical interpretation. Furthermore, Hovenkamp outlines the scientific developments in geology, Near Eastern studies (especially geography and history), anthropology and biology.

The overwhelming impression one gets upon reading this book is how much of recent writing on science and religion is a re-statement of ideas and themes that can be found in the 1820's and 1830's. For example, Samuel Stanhope Smith in 1815 argued persuasively that ultimately the truth of science does not conflict with the truth of Scripture. Apparent conflicts are the result of faulty science or faulty scriptural interpretation. It would seem that Smith's ideas have been echoed many times by contemporary writers on religion and science. Again, in a chapter on the scientific debate about racial variation Hovenkamp discusses attempts to find biblical support for explanations of racial differences. Apparently for evangelicals in 1850 as well as in recent years racial significance is found in the mark of Cain, the tower of Babel, and the curse on Canaan.

On numerous occasions we see that many of the recurring ideas used in debates about creation and evolution have their roots in this time. The long days of Genesis (1803), the gap theory (1835), and others have been with us a long time.

No doubt the greatest contribution that this book can make is to give us an appreciation for the considerably lengthy debate that has gone on regarding religion and

science. Others have discussed the interface of religion and science in other eras (e.g., Richard Westfall, *Science and Religion in Seventeenth-century England*) but the period 1800-1860 in America is foundational to anyone currently seeking to think through the relationship between religion and science. Hopefully, by reading a book like Hovenkamp's we will be encouraged to go beyond past ideas and to look for new formulations regarding the interface of religion and science.

Reviewed by Ronald J. Burwell, Department of Sociology, The King's College, Briarcliff Manor, N.Y.

THE CHALLENGE OF MARXISM: A CHRISTIAN RESPONSE, by Klaus Bockmuehl. Downers Grove, Ill: Intervarsity Press, 1980. Index included; 187 pages, not including index. $4.95.

Bockmuehl has quite successfully accomplished the rather difficult task of representing the very complex theoretical structure and world view found in Marxism in a clear straightforward manner, understandable by any moderately intelligent layman. All too typically, expositors of Marx either become hopelessly entangled in minute details and "movements" in Marx's thought, or oversimplify the Master to such an extent that the reader goes away with a distorted perception of the Marxist world view. Bockmuehl avoids both of these extremes as he presents the challenges of Marxism to contemporary Christianity.

Bockmuehl opens the book with a recognition of the emerging widespread appeal of Marxism, particularly in the West which the author claims is finding itself in a spiritual vacuum. Marxism is challenging the church in four specific ways as it (Marxism) responds to this vacuum: it claims knowledge of the "truth" in an age of relativism; it mobilizes its knowledge of truth to action; it challenges the "unreality" of much theology (which Marx claims is characteristic of the essence of all religion); and it provides a purpose for life in an eschatology calling for remade men through radically altered social structures.

The remaining three sections of the book present the challenges of Marxism in: (1) his critique of religion, which claims that all religion is illusory and ultimately finds its source in human experience; (2) Marxist-Leninist ethics which are ultimately oriented toward the realization of the true nature of man while working within (and at the same time attacking) historically specific conditions which alienate man; and (3) the program for creating the "new man" through altered property relations.

Bockmuehl's insightful analysis does not stop short of a radical critique of the Marxist position in these areas. The author writes, for example, "Christians must not be taken in by the myth that selfish individuals can form a universally unselfish collective." (p. 45) By addressing Marxism with the breadth that he does, however, Bockmuehl is not able to provide the depth of analysis of some of the more germane issues in Marx's writings that might be desirable. Equal attention is given, for example, to Marx's critique of religion as to his conception of the "new man", even though the issue of religion occupies a relatively minor place in Marx's work when compared to the prolific philosophic writings on the nature of man which occupied most of Marx's early works. (The critique of religion was, of course, *part* of these philosophic works.) Also, one wonders why the book gives so much attention to Leninist ethics and programs, particularly in light of the opening sentences of the book:

> Today Marxism is the dominant ideology for many people whether they like it or not. This is true not only for countries under Communist rule, but also for Western and Third-World countries, although admittedly in different ways. (p. 9)

Elsewhere, Bockmuehl implies that in the present age the West may be even more affected by Marxist philosophy, although in a more subtle fashion, than its Eastern counterpart. Given the book's Western audience, the author might better have given more attention to some of the basic philosophical issues affecting the West, and less to their Soviet application. These issues aside, however, the book presents a refreshingly clear and accurate conception—and critique—of Marxism.

More central to the book's thesis, however, is the challenge that Marx presents to contemporary Christian faith. The church has failed to assert its biblical heritage, and while Bockmuehl rejects the thesis that Christian faith is an "opiate", its historical expression is vulnerable. Marx challenges, for example, the ahistorical and highly subjective nature of much of Christian theology. Not only are the great theologians at fault, however; the Lordship of God is continually denied in our daily, private lives. Bockmuehl's clear and honest recognition of the nature of the challenges which Marxism poses to the Christian faith is possibly the book's greatest contribution, and should be a valuable asset to any serious Christian grappling with the issues of our time.

Reviewed by Charles E. Faupel, Division of Criminal Justice, University of Delaware, Newark, Delaware.

FOSSILS: KEY TO THE PRESENT, by Richard B. Bliss, Gary E. Parker, and Duane T. Gish, CLP Publishers, San Diego, California. Paper, 81 pages. $4.95.

Any attempt to objectively present the emotionally charged subject of Creation *vs* Evolution is difficult in the best of circumstances. Richard Bliss, Gary Parker, and Duane Gish, however, are attempting the impossible in *Fossils: Key to the Present*, a colorfully illustrated and interestingly written book intended to introduce this topic to grade school age children.

The authors state early on that the questions in this matter "cannot be answered with certainty." Their goal is to

present a two-model study of the issue, allowing children to compare "two points of view on a subject, both to encourage careful thinking and to avoid prejudice."

It is a needed effort, but runs into two problems.

First, a convinced creationist can no more objectively treat evolution than can a Baptist dispassionately analyze the merits of the Papacy. The inevitable creationist slant pervades the work. Still, books supporting evolution are usually strictly one-sided, and the authors here do mention both views.

Second, and more important, this thin volume cannot, no matter how clearly and interestingly written, provide young children with the means to make valid decisions on the issue. One may as successfully present to third graders the complex debate about an Open *vs* Closed universe in a few score pages of pictures and big print.

It is doubtful whether the intended audience of this book is capable of making a decision based primarily on the evidence. The beliefs of parents, teachers, and peers will probably be dominant in shaping their conclusions. And, in the process of distilling complicated arguments into the simplest possible terms, the authors are forced to so simplify the material that it loses much of its value as the basis for making such a decision. (This is the same problem faced by proponents of evolution.)

Nevertheless, this book is superior to most others on the subject. Pleasant to read and not insulting to the intelligence, it should succeed in its goal of stimulating young children to at least begin thinking about the ideas. In settings where creation is more or less considered an established fact and evolution is the tenuously supported theory, this book should be popular and well received.

Reviewed by Robert Schier, Box 534, U.C.I. Medical Center, 101 City Drive South, Orange, California.

THE TEXT OF THE OLD TESTAMENT, by Ernst Würthwein, 2nd English edition. Grand Rapids: William B. Eerdmans Publishing Company, 1980. Pp. 244. $8.95

As the subtitle of this work indicates it presents "An Introduction to the Biblic Hebraica." The work itself has an interesting history. The first edition dealt with Kittel's *Biblia Hebraica* (BH), but this edition concerns the new *Biblia Hebraica Stuttgartensia* (BHS), edited by K. Elliger and W. Rudolph. This is now the definitive edition of the Hebrew Old Testament. A fourth German edition of Würthwein's work appeared in 1973 to discuss the extant parts of BHS. The present English edition is based on this German edition, updated by the author's notes toward a further revision in light of the completion of BHS in 1977.

The first major section of the book under review concerns "The Transmission of the Text in the Original Language." It begins with a discussion of the physical aspects of writing materials and the script, followed by an introduction to the Masoretic text. Its history is briefly given as are the different scribal techniques employed by the Masoretes, including their addition of vocalisation. The *Masora*, a collection of Masoretic textual notes, is also explained. Finally there is a survey of the major Masoretic manuscripts and printed texts, ranging from the Qumran material down to the Hebrew University Bible Project based on the Aleppo Codex. The section is concluded by a brief note on the Samaritan Pentateuch.

In his next major section, Würthwein discusses the versions, or early translations of the Old Testament. The main emphasis is on the important Greek Septuagint, the Aramaic Targums, and the Syriac version, but there is also included a discussion of other important witnesses, i.e. the Latin, Coptic, Ethiopic, Armenian and Arabic versions.

The final text section discusses the area of text criticism—what scholars are trying to do with all of these different sources concerning the Old Testament text, why there are differences between these sources leading to the need for textual criticism, and finally, how one practices textual criticism.

The layout of the body of the book aids in the use of BHS (and BH). Wherever there is a discussion in the text of some point referred to in the marginal apparatus of the Bible editions, Würthwein places the symbol used in his margin so that the reader can readily see what is being discussed. To facilitate the use of this English edition with the earlier BH, variants in notation in that text edition are given in brackets. It is in this area of marginal notations where I noted several editorial anomalies. BHS does not note scribal corrections in 2 Sam 20:1; 1 Ki 12:16 or 2 Chr 10:16, contrary to Würthwein (p. 19), nor are scribal omissions said to be noted in the BHS of Ruth 2:11 or Jer 32:11. Other minor corrections are needed.

Würthwein's contributions are very useful for the student of the Hebrew Old Testament in two areas. Not only does he introduce one to the use of the authoritative text edition, but also shows one the background of the text and how it fits in with the rest of the textual tradition. The book is especially useful since it is so up-to-date, even including a plate of a text from *Izbet Sartah* published only in 1977. The book will be a standard reference and learning tool, having been updated to ably serve the next generation of students of the Hebrew Old Testament.

Reviewed by David A. Baker, Lecturer in Hebrew, Regent College, Vancouver, British Columbia, Canada.

SOURCE BOOK ON THE ENVIRONMENT: A GUIDE TO THE LITERATURE, by Kenneth A. Hammond et al, University of Chicago Press, Chicago, 1978, 611 pp.

As the editors state in the first line of their introduction, "The goal of this source book is to provide a broad guide to selected aspects of environmental literature." In this reviewer's opinion, they have achieved this goal admirably.

The book itself is divided into four main sections titled, "Environmental Perspectives and Prospects," "Environmental Modification: Case Studies," "Major Elements of the Environment," and "Research Aides." In the first three sections, we are given twenty-four chapters in which various authors present general, excellently referenced overviews on the literature of a particular topic or item of environmental concern. The authors of these chapters are generally objective, although occasionally a bias or two appears. Yet, this does not detract from the overall usefulness and informativeness of these chapters. The fourth section is very helpful for those with an active interest in environmental issues. It contains a list of related periodicals and organizations and a review of federal environmental legislation.

The twenty-four chapters average only twenty pages, including each paper's list of references, so we are naturally given only a limited discussion of the issues involved. However, the copious references insure that the reader will be able to follow up on the discussion and questions presented in each chapter. This, indeed, is the purpose of the book. Occasionally it seems that some issues should be given more space. For instance, there were only a few paragraphs that dealt with the important and controversial issue of the effects of nuclear energy wastes on the environment. The sheer number of topics covered, however, more than makes up for this shortcoming.

Over all, this is an excellent book that can be interesting and informative to a casual reader and a valuable resource to someone involved in these areas of study. This book is also a good basic or supplementary text for introductory courses on the environment or ecology. If someone is at all interested in a serious study of the environment and man's impact on it, this book is well worth its price.

Reviewed by Joseph P. Bassi, Captain, USAF; Det. 9, 1 Weather Wing (MAC), Air Weather Service.

THE SPIRITUAL NATURE OF MAN, by Alister Hardy, Oxford: Clarendon Press, 1979, 162 pp., $19.95.

This volume is in the same genre as William James' *The Varieties of Religious Experience* (1902) and Edwin Starbucks' *Psychology of Religion* (1899). These early writings about the scientific treatment of religious experiences serve as a harbinger and model for the present volume.

This book is based on eight years' work of the Religious Experience Research Unit which was established at Manchester College, Oxford, in 1969. It is divided into nine chapters, two appendixes, a bibliography (very helpful for further study), and an index. Purpose, method, result, and meaning of the research are discussed.

The purpose was to collect a body of knowledge based on personal experience, examine these in detail, and based on quantitative studies, draw tentative conclusions. The method was to collect over 4,000 first-hand accounts concerning people's experience "of a benevolent nonphysical power which appears to be partly or wholly beyond, and far greater than, the individual self."

The results are displayed through categories based on the distinguishing features of metaphysical experiences reported by the volunteers. The varieties of spiritual awareness fall into two main areas: sensory and behavioral elements, and cognitive and affective elements.

Hardy disclaims any support for specific religions or proof for the existence of God. He writes: "I am not in any way endeavoring to find support for this or that form of institutional religion or indeed for the doctrines of any particular faith." True to his aim, he does not bolster any religious perspective, although quoting from those who hold doctrinaire positions. Perhaps this avowed strength is also a perceived weakness. The Christian is not likely to come away feeling that faith has been strengthened or an apologetic developed for revealed religion.

Hardy contends that people are religious by nature. Religion is defined as personal experience related to transcendental reality, divine presence, and religious experience in all its forms.

Hardy has described an empirical effort to collect and analyze reports of awareness of a benevolent nonphysical power. The main traits of religion experience are transcendental reality, childhood manifestations, a sense of presence, personalization, and the phenomenon of prayer. Paul's observation to the Athenians could be typical of all people: "I perceive that in every way you are very religious." (Acts 17:22)

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

THE FAMILY AND THE FELLOWSHIP: NEW TESTAMENT IMAGES OF THE CHURCH, by Ralph P. Martin, Eerdmans, 1980, $4.95, 142 pages.

Ralph P. Martin, Professor of New Testament at Fuller Theological Seminary, is the author of several other books

including *New Testament Foundation*. To those already familiar with his work, *The Family and the Fellowship* is a happy addition; to those unfamiliar, this little book is an excellent place to start.

The author begins by arguing that full human experience is possible only in community, and that, in particular, new life in Christ requires community for sustenance and growth. It was the intention of Jesus to establish a community, namely his church. This occurred at Pentecost, and now the "living Lord is present with his people by the Holy Spirit whose work is to contemporize that personal presence... ."

One of the most important concepts in the book is fellowship: "Taking part in something with someone." Professor Martin urges us away from a modern overemphasis on "with someone" to a New Testament emphasis on "in something"—the realities of the Christian faith. We are reminded of the Spirit's sovereign disposing of charismata to individual believers, equipping each one for a particular contribution to the corporate experience but making no one indispensable.

The church has always had leaders, but no single "pattern of ministry" is discerned as being applicable to all times and places. Rather, diversity is evident in the New Testament, and is to be expected in the church today. The criterion of evaluation is "what is good for the church." But the experience of God is not mediated through a leadership structure—God makes himself known in various ways, including baptism and the Lord's Supper.

It is sad that the church suffers from disunity, but in order to get on with its mission, agreement about Jesus Christ is necessary. "This would be the irreducible minimum of agreed truth: is he confessed and believed as 'true God, true man' and is he the sole Savior of the world and its exalted Lord?" With respect to relationship with the world, the church must be concerned with discipline internally to keep the differences between the two spheres clear, and it must speak against evil in the surrounding society.

The book concludes with an analysis of various models for the contemporary church: the lecture hall, the theatre, the corporation and the social club. Each of these has some attractive emphases but each is ultimately inadequate. More meaningful are the scriptural categories of the temple of the Lord, the body of Christ, and the family of God.

This is a well-written book about an important subject. Professor Martin's stated intention (Preface) is to help us "to see the necessary place of the church in God's design and to take a positive attitude to it." He certainly succeeds in the former, and it is up to us as readers to respond with the latter.

Reviewed by David T. Barnard, Assistant Professor, Department of Computing and Information Science, Queen's University, Kingston, Ontario, Canada K7L 3N6.

A LONG OBEDIENCE IN THE SAME DIRECTION: DISCIPLESHIP IN AN INSTANT SOCIETY, by Eugene H. Peterson, Downers Grove, Illinois: Intervarsity Press, 1980, 197 pp., $4.95.

Psalms 120 through 134 (known collectively as the Songs of Ascents) provide the framework for Eugene Peterson's book. He points out that these Psalms were probably sung by Hebrew pilgrims as they traveled to Jerusalem for worship; thus the descriptive "ascents" is both literal and figurative, since the journey to Jerusalem was both an upward movement to the highest geographical point in Palestine and a metaphor of a life moving upward toward God. It is through this metaphor that Peterson evokes our sense of kinship with those early Hebrews, our forerunners in faith, and he helps us to sing these Psalms as our own songs, images of our own pilgrimage.

As you read this book, expect neither an explication of the Psalms nor a "how to" approach to discipleship. The book speaks quietly, reminding us of truth and focusing our attention on reality. The Psalms and Peterson's reflections upon them help us to clear away the clutter of external demands on our attention and direct our energies toward understanding and obeying the Lord. As the author states in the first chapter, he has not "sought to produce scholarly expositions. . .but to offer practical meditations which use these tunes for stimulus, encouragement and guidance." In so far as this is a statement of his purpose, I think he has accomplished it admirably.

The title [taken, ironically, from a quote by Friedrich Nietzsche] had a powerful effect on me before I even read the book. While our commitment to the Lord is often an inconsistent series of good intentions, Peterson reminds us that it is meant to be a "long obedience in the same direction," a slow and deliberate pilgrimage. He helps to clarify our struggle by juxtiposing "our attention spans. . .conditioned by thirty-second commercials" with the sustained interest required of a disciple. Such sustained interest is not particularly popular in "an instant society" where fast-paces schedules with no time for the quieter disciplines have become the social norm.

Through effective illustrations and an abundance of appropriate quotations from other authors, Peterson develops the theme of discipleship as a pilgrimage. He moves from the initial stage of "repentance" (Psalm 120) through such steps as "worship" (Psalm 122), "perserverance" (Psalm 129) and "obedience" (Psalm 132). The end of this pilgrimage is "blessing" (Psalm 134). There is a strong sense of community in the realization that the path is a well-established one. Though our external world has little in common with that of the Psalmists, the requirements for becoming what we were created to be have not changed.

The author's style is calm and sure. Peterson is clearly an experienced traveler who is qualified and willing to give direction to his fellow pilgrims. He does not offer any new or startling ideas in his book. Rather, he shares with us some fresh insights into ancient truths.

Reviewed by Bonnie J. Mansell, 807 S. Catalina Ave., #3, Redondo Beach, California 90277.

Letters

Appreciation and Suggestions

I followed with some interest the series of articles on "Science and the Whole Person" appearing in the *Journal ASA* and found particularly insightful the article concerning determinism and free will, crime, punishment and responsibility.

The conclusions concerning the purposes of punishment, retribution, the administration of justice, and the intrinsic value of human life requiring extreme punishment when such a human life is taken, are consistent with the views of Walter Berns in his recent publication.

I did want to take time to recommend that book since I did not see it referenced in the bibliography: Walter Berns, *For Capital Punishment: Crime and the Morality of the Death Penalty*, Basic Books, Inc., New York, 1979.

Carl Liebert, Jr., M.D.
804 Medical Towers North
Louisville, Kentucky 40202

Please accept my heartiest congratulations on the fine article on "Abortion," in the *Journal ASA* (September, 1981).

I would like to make two suggestions: (1) My article, "Society and Abortion," *Journal ASA* 30, 13 (1978), might be added to your list of references; and (2) a practicing, licensed, experienced lawyer should write a review article on your paper for the *Journal ASA*, and should conduct seminars for the laity around the USA using your extensive review on abortion.

Harold M. Spinka, M.D.
10412 So. Whipple
Chicago, Illinois 60655

Simplistic and Misleading

In the June issue of *Journal ASA* there appears an article by Jerry Bergman entitled "Aggression: Shall I Let It Out or Control It?" On the basis of my own thinking and experience, I believe the article to be simplistic and misleading on a number of counts. The errors are conceptual as well as empirical.

First, as to the conceptual confusions. Bergman uses the term "aggression" without defining it, and tries to make it appear that aggression is the same as anger (later, on p. 91, he employs the term *violence* in such a way as to suggest that it is indistinguishable from both of the foregoing). This, however, will hardly work. *Websters New Collegiate Dictionary* defines "aggression" as "a forceful action or procedure (as an unprovoked attack) especially when intended to dominate or master. . .hostile, injurious, or destructive behavior or outlook especially when caused by frustration." To speak as Bergman does, therefore, of "ventilating one's aggression" is inherently confusing, since aggression by definition is a "behavior word."

Anger, by contrast, is a "feeling word." One may *feel* angry without *doing* anything, and certainly without acting aggressively. It is also possible, though I admit this seems initially less plausible, to feel anger and not recognize it to be such (because of one's defense mechanisms and emotional patterning).

Bergman does make certain important distinctions, such as that between "verbal aggression," on the one hand, and on the other what he calls "the need to talk about one's feelings" (p. 89). "Importantly," he says, "it is not so much the fact that one is angry that should be of concern, but how one *reacts* to this anger" (p. 90). What this overlooks, however, is the critical fact that many neurotic persons cannot feel their anger at all (only their tension), and thus lack the self-knowledge which Bergman assumes all angry persons possess. In fact, throughout his essay Bergman credits human beings with much more insight and self-awareness than experience—including clinical observation—suggests that they in fact have. The key element in "learning to control one's emotions and physical outbursts," he says (p. 93) is "proper training, primarily from the parents" (though one also needs knowledge and "will power," the author tells us). What he does not mention is that neurotics specifically, and most of us generally, have not *had* adequate parenting. Telling us now (as adults) to "reason together" in the bland assurance that this will take care of anger which has been "bottled up" (to use his apt phrase) since early childhood is simply naive. And many people *are* carrying around anger which has been bottled up, repressed, for a very long time.

To be sure, Bergman is correct in saying that *acting out* angry feelings by "lashing out" verbally, throwing things, being violent, etc., is both inappropriate and counterproductive. It may simply increase rather than decrease the probability that such behavior will be resorted to in the future. But it does not follow, from the fact that acting out repressed anger is counter-productive and socially undesirable, that the "ventilationist" position is incorrect; it may be that there is a safe and healthy way to express anger, fear, grief and other "negative" emotions which the individual, for one reason or another has not allowed himself to admit. Bergman himself concedes that "there are some specific conditions that are best treated under appropriate guidance by ventilation techniques" (p. 91), but he immediately adds that these are "quite uncommon" and that even in these cases, none of which he bothers to specify, it is usually sufficient simply to "help one control and accept his hostility."

Therapeutic experience, however, provides numerous counterexamples to this claim. This is where people like Janov and Casriel come in. Bergman cites Arthur Janov at the start of his essay, only to dismiss him. Yet Janov has pioneered the development of what he calls primal therapy (and what Cecil Osborne, in *The Art of Understanding Yourself*, calls primal integration), a form of therapy that has been found enormously liberating to an increasing number of people. I myself have undergone many hours of this therapy, and am currently being trained as a therapist so that I will be able to assist others. My experience with the therapy can, for present purposes, be summarized briefly: ventilation works. To relive and truly *feel* at a deep level of one's personality the painful emotions of childhood can and does leave the individual more relaxed (less tense), happy and able to cope with the circumstances of his present life. It also, and above all, helps free

him to be able to love himself, others and God.

Primal integration is not a panacea, but the fact that it works for many individuals shows clearly enough that Bergman is out of bounds in claiming that "all of our present research indicates that the ventilationist position is invalid" (p. 93). Only if one makes certain dubious assumptions of a behavioristic sort, as Bergman seems oddly inclined to do, is one obliged to dismiss or distort the facts which are inconsistent with those assumptions. My personal experience, at least, will not permit me to engage in that kind of distortion.

Frederich R. Struckmeyer
Department of Philosophy
West Chester State College
West Chester, Pennsylvania 19380

Was Honesty Questioned?

William F. Tanner's "Time and the Rock Record" (*Journal ASA*, June, 1981) included some excellent insights and principles to be used in approaching the various positions available to Christians on the question of origins. Most useful were those points made under the headings "What Do We Learn From the Bible?" and "What Do We Learn From Nature?"—though I would not necessarily endorse all the points under each heading.

It would, however, have been very helpful to those who take a recent creationist viewpoint of origins if Dr. Tanner had enumerated specific instances of invalid inference from scientific data and scriptural passages on the part of creationist scientists, and explained precisely why he believed them to be invalid. His brief references to several minor points in creationist arguments, without citation and without specific refutation, is quite unhelpful.

What most distressed me about Dr. Tanner's article, however, was the intimation in the third-to-last paragraph that he believes some of the creationist scientists are simply dishonest with their handling of the facts. He refers to ". . .citation by persons who are willing to mis-state the observable and the verifiable facts of geology in order to support what they consider to be a biblical doctrine."

The Apostle Paul enunciated what I believe should be one of the key principles of Christian discourse on topics of disagreement (and in lots of other aspects of the Christian life) when he wrote, "Do nothing out of selfish ambition or vain conceit, but in humility consider others better than yourselves." Phil. 2:3.

When this is worked out in practice, it seems to me it demands at least that we give fellow Christians (and indeed, nonchristians as well) the benefit of the doubt wherever possible. It means at least that I should imagine myself doing the very thing for which I judge my brother, and then consider that even if the act was wrong, he had a better motive for it than I would have had in his place. If we believe they have wrongly represented data, the least we should do is to grant that they did it accidentally, not out of a willingness to misconstrue the facts. Tanner's comment fails to give creationist scientists that benefit of the doubt.

It is this attitude which I believe has helped make communication among the various positions in the origins debate even more difficult than it would otherwise be. The tendency of both sides to turn theoretical disagreement into moral judgment makes dialogue rather uncomfortable, if not impossible.

A recent conference in Toronto of theologians discussing the inerrancy controversy proved what great strides can be made when Christians of differing points of view come together with an earnest desire to understand each other. Many misunderstandings were cleared up, mistakes were admitted on both sides, and a groundwork was laid for continued dialogue. Some even confessed to having wrongly judged the moral character of their brothers. Such a conference is long overdue for the origins question. I hope ASA will consider that possibility.

P.S. If Dr. Tanner did not intend his comment to denote questioning of the honesty of creationist scientists, I most humbly apologize for mistaking his intent.

Cal Beisner
P.O. Box 25
Pea Ridge, Arkansas 72751

Statement required by the Act of October 23, 1962, Section 4369, Title 39, United States Code, showing ownership, management, and circulation of

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILATION

Published Quarterly at P. O. Box J, Ipswich, Massachusetts 01938.

The name and address of the editor is: Richard H. Bube, 753 Mayfield Avenue, Stanford, California 94305.

The owner is the American Scientific Affiliation, P. O. Box J, Ipswich, Massachusetts 01938.

The known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: None

	Average No. of copies each issue during preceding 12 months	Actual No. of copies of single issue published nearest to filing date
Total No. copies printed	6227	5658
Paid circulation		
Sales through dealers and carriers, street vendors, and counter sales	10	0
Mail subscriptions	5008	5008
Total paid circulation	5018	5008
Free distribution	100	101
Office use, left-over, unaccounted, spoiled after printing	1109	549
Total	6227	5658

I certify that the statements made by me above are correct and complete.

Robert L. Herrmann, Executive Secretary

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

A closely affiliated organization, the **Canadian Christian and Scientific Affiliation,** was formed in 1973 with a distinctively Canadian orientation. The **CSCA** and the **ASA** share sponsorship of the publication. **CSCA** subscribes to the same statement of faith as the **ASA** and has the same general structure. However, it has its own governing body with a separate annual meeting in Canada.

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

Associate Membership is open to anyone with an active interest in their purposes. *Members* hold a degree from a university or college in one of the natural or social sciences, and are currently engaged in scientific work. *Fellows* have a doctoral degree in one of the natural or social sciences, are currently engaged in scientific work, and are elected by the membership. *Dues:* Associate $20.00, Member $26.00, and Fellow $36.00 per year. A member in any of these three categories can take the *special student rate* of $10.00 per year as long as he is a full time student.

INDICES to back issues of the *Journal ASA* are published as follows: Vol. 1-15 (1949-1963), *Journal ASA* 15, 126-132 (1963); Vol. 16-19 (1964-1967), *Journal ASA* 19, 126-128 (1967); Vol. 20-22 (1968-1970), *Journal ASA* 22, 157-160 (1970); Vol. 23-25 (1971-1973); *Journal ASA* 25, 173-176 (1973); Vol. 26-28 (1974-1976); *Journal ASA* 28, 189-192 (1976); Vol. 29-32 (1977-1980); *Journal ASA* 32, 250-255 (1980). Articles appearing in the *Journal ASA* are abstracted and indexed in the CHRISTIAN PERIODICAL INDEX and in RELIGIOUS AND THEOLOGICAL ABSTRACTS. Present and past issues of the *Journal ASA* are available in microfilm at nominal cost. For information write University Microfilms, Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106.

LOCAL SECTIONS of the American Scientific Affiliation and the Canadian Christian and Scientific Affiliation have been organized to hold meetings and provide an interchange of ideas at the regional level. Membership application forms, publications and other information may be obtained by writing to: AMERICAN SCIENTIFIC AFFILIATION, P.O. Box J, Ipswich, Massachusetts 01938, or CANADIAN CHRISTIAN AND SCIENTIFIC AFFILIATION, P.O. Box 386, Fergus, Ontario, N1M, 3E2.

CENTRAL CALIFORNIA
CHICAGO
DELAWARE VALLEY
GUELPH, ONTARIO
GULF-SOUTHWEST
INDIANA
NEW ENGLAND
NEW YORK CITY AREA
NORTH CENTRAL (Minnesota)
OREGON
SAN DIEGO
SAN FRANCISCO BAY
SOUTHERN CALIFORNIA
TORONTO
WASHINGTON-BALTIMORE
WESTERN MICHIGAN
WESTERN NEW YORK

SECOND CLASS POSTAGE
PAID AT BRAINERD, MINN. 56401

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

VOLUME 34 NUMBER 1 **MARCH 1982**