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*An evangelical perspective on science and the Christian faith*




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


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# PSYCHOLOGY IN THE '70's

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Today nine out of ten of the scientists who have ever lived are living.[1] Psychologists make up part of this pool of scientists. Of 300,000 scientists registered in 1968 by National Science Foundation, 23,077 were psychologists.[2] The American Psychological Association, founded in 1892, has about 30,000 members today.

Each year approximately 25,000 bachelor's, 5,000 master's, and 2,000 doctorate's are awarded in psychology.[3] With this generous supply of psychologists from the colleges and universities of the country, it might seem that a job shortage is imminent. However, as these totals show, most of those who major in psychology on the undergraduate level do not go on to become professional psychologists. One study revealed that only 9% of those who major in psychology at the undergraduate level become psychologists. Of these, 62% said they would major in psychology if they had to choose a major field again.[4]

For those who enter professional psychology in the seventies, the employment prospect looks good. Recently there has been an increase in unemployment in some fields of science, especially physics and chemistry.[5] However, psychology remains a field in which there are more jobs available than there are prospective employees and this situation should continue in some psychological fields.

In 1963 the American Psychological Association estimated that there were three jobs available across all fields of psychology for every qualified psychologist and indicated that the future was bright.[6] In 1970 the American Psychological Association confidently predicted developments which would result in "more numerous and more diversified careers in psychology than presently exist . . ."[7] This is in keeping with recent government and private studies which predict that psychology is one of the most promising occupations for the seventies.[8] The financial gains are attractive. Psychologists in 1968 had a median salary of $13,200 which was higher than the median for anthropologists, political scientists, sociologists, biologists, agriculturalists, or mathematicians.[9]

*With job openings scarce in some scientific areas, the employment prospect in psychology is a propitious one for the Christian.*

In the seventies some fields of psychology hold more promise than others for growth. Today most psychologists are connected with colleges and universities (40%),

with smaller numbers employed in schools (12%), clinics, hospitals and medical schools (11%), government (8%) and industry (6%).[10] Of all psychological areas, the field of mental health is the fastest growing. For instance, community psychology is rising to provide mental health care in an economic and accessible way. Community mental health offers a wide range of services and involves restructuring traditional clinical practice.[11]

Just how many Christians are employed in professional psychology is unknown. That there are some can be attested by the existence of the Christian Association for Psychological Studies which in 1970 had 374 members. This represents a sizable increase over the 161 members listed in 1965.[12]

With job openings scarce in some scientific areas, the employment prospect in psychology is a propitious one for the Christian. There is a continuing need for highly trained personnel in Christian education. For instance, on the college level, qualified instructors are needed. A check of the catalogs of five well-known Christian colleges indicates that only about one in three psychology teachers holds an earned doctorate and the doctorate is not always in psychology.[13]

Of course, a Christian can work in the field of psychology without a doctorate. While 60% of all psychologists associated with the American Psychological Association hold doctorates,[14] those who do not are increasingly in demand to meet the educational and health needs of society.

In the area of counselling, Christian organizations are in need of psychologists with academic and theological preparation. Christian schools are becoming more aware that the Christian student is not exempt from the stress which often results in emotional imbalance and consequent need for professional help. The Christian psychologist can exert a powerful influence for good in meeting the needs of students, missionaries, ministers, and other Christians.

In addition to helping believers, the Christian psychologist may direct his efforts toward the needs represented by the 750,000 patients in mental institutions and the 40,000 persons who lose their lives each year by suicide or murder.[15] Behind these human tragedies are poorly adjusted people in need not only of psychological therapy but also of Christian empathy and succor.

The purpose of the American Psychological Association is a noble one: "to advance psychology as a science and as a means of promoting human welfare." The Christian psychologist in the seventies can have the satisfaction of knowing that his infuence is helping give psychology a biblical orientation as it seeks to achieve its goal.

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### *ASA's First Full-Time Executive Secretary*

WILLIAM D. SISTERSON

This fall the ASA appointed its first full-time Executive Secretary in the person of William D. Sisterson. Born in 1942, Bill received a BS degree in Industrial Engineering from Southern Methodist University in June 1965, and a ThM degree from Dallas Theological Seminary in May 1969. During these years Bill was active in Campus Crusade and Inter-Varsity Christian Fellowship on campus. He has worked as a laboratory technician with the General Electric Co. and as an industrial engineer with Gifford Hill & Co. Since 1968 he has been associated with the Inter-Varsity Christian Fellowship as campus staff, office manager, and in international development. Let's all welcome Bill Sisterson and give him our support and cooperation.

### *Reader's Responses to Dialogue on Inerrancy*

(Journal ASA *24, 80, June 1972*)

No one would claim that a 2.8% sampling gives statistically meaningful results, but that is all the returns that our readers have given us on our Dialogue on Inerrancy. We can think of all kinds of reasons that our urgent requests for response have fallen on deaf ears but we prefer to believe that our readers just couldn't bring themselves to cut the response form out of the *Journal ASA* and thus mar its otherwise pristine beauty. The responses are as follows.

12% I agree wholly with Maatman.

16% I agree mostly with Maatman, but some with Bube.

27% I agree mostly with Bube, but some with Maatman.

39% I agree wholly with Bube.

6% My position is substantially different from either Maatman's or Bube's.

If we assign a numerical value of 1 to "wholly", ¾ to "mostly" and ¼ to "some", we conclude that of this sampling 31% favored Maatman, 63% favored Bube, and 6% differed from both.

# Christianity and Psychology: Contradictory or Complementary?

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Psychology has grown into a giant during the 20th century. No other age has witnessed such intense concentration upon the nature and functioning of *homo-sapiens*. Psychological terminology has become an integral part of the common vernacular and psychological concepts strongly influence contemporary thought.

Both psychology and Christianity deal intimately with the phenomenon of man. Psychology attempts to gather data inductively, formulate theories, and arrive at a probablistic and naturalistically based understanding of the human being. Christianity, as revealed in the coherent whole of the Scriptures, proceeds deductively from the supernatural *a priori* of special creation in God's image. The psychologist generally concentrates upon man's attitudes and behavior as they relate to each other as empirical phenomenon, while Christianity roots these behaviors and attitudes in the framework of man's inherent relationship and responsibility to God.

Psychology has challenged contemporary Christianity to a more involved understanding of men as human beings, while debunking or ignoring much of the basic Christian system in the process. Complementarity between psychology and Christianity is implicit in an honest investigation of the common subject matter, man, while conflict is implied in the necessary embrace of (antithetical) philosophical positions prior to the accumulation of data and during interpretation of that data.

We would like to consider briefly some of these areas of conflict as well as some dimensions of potential complementarity.

## AREAS OF CONFLICT

### Content Domain

Although the root word for psychology, *psuche*, originally meant "soul", modern psychology generally rejects consideration of any dimension except the scientifically verifiable. This is particularly true for the American psychological tradition. Strict adherence to the scientific methodology of the physical sciences has characterized the approaches of bio-chemical reductionists and behaviorists like John Watson and B. F. Skinner.[1] While the full impact of bio-chemical reductionism is yet to be felt, the behavioristic approach has widely influenced contemporary theory and therapy.

The basic behavioristic assumption is that man is the product of environmental reinforcement patterns. Consequently, there is no need to talk about internal psychic or spiritual realities except as a convenient intermediate construct which is to be considered only as a temporary equation. An increasing number of therapists, such as J. Wolpe[2] are using behavior therapy which is based primarily upon conditioning techniques and ignores the consideration of internal dynamics as valid data *per se*. One has only to consider derogatory attitudes toward the parapsychological (ESP, telepathy, etc.) to realize that even psychologists who are not strict behaviorists are firm adherents to naturalistic explanation of the solely empirical domain.

*Complementarity between psychology and Christianity is implicit in an honest investigation of the common subject matter, man.*

Adoption of this system can be criticized as potentially inadequate because it is a closed system which precludes information from human experience that may be metaphysically real and psychically meaningful but not empirically testable. A further problem is that the atmosphere created is one of despair. Man becomes hollow, the fated victim of impersonal environmental forces. His values, hopes, concept of responsibility and purpose, self awareness, and wishes become debunked and are treated as irrelevant except as they are the product of environmental input. Man, as we have known him historically, and as we still experience awareness of ourselves, disappears in dutiful compliance to the method.

The essential conflict with Christianity, then, stems from an over-emphasis on empirically-oriented methodology which may result in the rejection of valid content because it doesn't fit the method. Such naturalistic disregard for man's spiritual dimension, if it really is an integral part of man's nature, produces a truncated understanding of man's nature. Such an approach might be expected to be long on analysis and short on solutions.

On the other hand, Christianity contributes unnecessarily to the conflict over acceptable data if valid factual

information, which complementarily fills in the Scriptural framework, is rejected. Ignorance of man's basic psychic and biological character presents us with an unrealistic picture of ourselves, which does not quite match our experience of daily living. Such data need to be retained in a more harmonious interpretative framework, and not be rejected because they aren't strictly spiritual. For example, the Christian must basically accept the fact of sin as the cause of personal and interpersonal disruption. Given man's fallen state, one of imperfection even after redemption, he must seek to employ all truths at his disposal in the correction of his condition. To suggest that everything would be corrected if the whole world were simply saved overlooks our need for sanctification. Consequently, we must bring spiritual truths to bear on the personal and social conditions we face as fallen men, while at the same time helping to meet those very real needs of incarnate humanity. Failure to acknowledge the interrelated needs of the whole man leaves us bewildered and frustrated as we try to understand and help ourselves and others as parts of God's creation.

The Christian simply suggests that when all of truth is known, that is, when and if all information about man (including the non-empirical) is validly gathered, accurately interpreted and integrated, man will be seen as a creature fundamentally related to God the Creator. Incorporated in that complete perspective is an interrelationship of psychological and spiritual realities which makes man so unique. The burden of the proof, at this point, is upon psychological theories and hypotheses being presented as part of an incomplete, inductive system. Attempts to discredit the "open" Christian system (one which incorporates both empirical and non-empirical dimensions in the understanding of man) must be based on *a priori* philosophical differences because such conclusive attacks cannot be made purely on the basis of probabilistic, incomplete evidence.

### Philosophical Assumptions

Twentieth-century man must stand in awe at the physical and technological achievements produced through the application of scientific methodology. For many however this awe has been extended into worship of scientific objectivity. The result has been the debunking of any "non-objective" experience as non-valid, irrational or irrelevant.

This decision to admit only the objective, or empirically obtained data, as meaningful and valid knowledge is a philosophical choice which reflects a naturalistic value system. All psychological conclusions, particularly those about man's essential nature, are drawn on the basis of subjective presuppositions. Even the choice of areas and techniques for experimentation reflect subjective preferences, "non-scientific" value judgements, and philosophical assumptions of the experimenter. The point is that science cannot be totally objective as long as man is in the picture, and should not be represented as such. It *is* more objective than any other system man has devised, and should be used with an awareness of initial assumptions.

To begin one's investigation of man with acceptance of his spiritually-rooted orgins becomes, then, an equally valid starting point.[3] The test of these initial value preferences is in their ability to describe adequately the essential experiences of men, and to prescribe effective avenues for enduring personal and interpersonal growth.

One basic assumption which permeates contemporary social science and conflicts with the Scriptural view of man is that man is a passive, environmentally determined being. While there is strong evidence which supports the *influence* of genetic and environmental input upon our development as persons, complete acceptance of this viewpoint, within the naturalistic system, forces us into despairing fatalism. Without the reality of the choosing self and its correlate of personal responsibility, we might just as well authenticate ourselves by commiting suicide because it conceivably is the only act of freedom available (cf. Jaspers). In effect, decisionless man is man without responsibility, Hollow Man.

*To suggest that everything would be corrected if the whole world were simply saved overlooks our need for sanctification.*

Popularization of the deterministic motif has led to increasing personal and social irresponsibility. Indeed, William Glasser[4] suggests that the basic pathology *is* a failure to take responsibility; that psychological health and interpersonal relatedness can only come as we choose and accept our momentary responsibilities. Viktor Frankl[5] argues that meaning in life is gained only as one fulfills his unique tasks in life. The Christian position adds that those tasks stem from our fundamental relationship of creature to Creator.

Failure to accept our positions as active agents capable of producing changes as we act responsibly has resulted in increased feelings of despair and alienation, in which the main effort becomes an attempt to blame others for our condition. Such projective defenses breed conflict, and the pathology of chronic bitterness. Certainly other people and conditions are to blame some of the time, but we are responsible for how we accept and creatively utilize those conditions.

The hope of man is in the possibility of making decisions, and in the supreme decision of establishing and maintaining a relationship with God. Indeed, the very act of salvation necessitates complementary responses and responsibilities on the part of both God and man. Living the Christian life necessitates a responsible, active process of "living life with a due sense of purpose, understanding what the will of the Lord is" (Eph. 5:15-17.) In this view, cause and effect relationships—including prior choices—influence man but do not irrevocably and impersonally determine him. Irresponsibility becomes a choice, not a necessary condition.

In this conception of man as an active, determining, responsible and whole being, we find complementarity between the Scriptures and psychology. This is particularly so with more humanistically-oriented schools of psychology represented by such figures as Gordon Allport,[6] Viktor Frankl,[7] Rollo May,[8] Erich Fromm[9] and Abraham Maslow[10]. Complementarity, of course, does not imply complete agreement.

## AREAS OF COMPLEMENTARITY

Three areas in which psychology and Christianity are potentially complementary are the necessity of transparency for personal and inter-personal growth, the necessity to transcend a mechanical existence

through the experience of Love in I-Thou relatedness, and the necessity for a sense of significance or positive self-esteem. These concepts, while distinct, are so interrelated that they will be treated as a whole.

The recent rise of encounter or T-groups indicates a growing concern for honest and genuine relationships with one's self and with others. Although such groups have been criticized as to their long-range effects outside of the encounter group, their positive emphasis has been upon the establishment of transparent relationships. Such transparency represents the peak of psychological growth. It necessitates painful honesty with one's self and the courage to brave the potential pain of nondefensive interpersonal relationships.[4]

Christianity both adheres to and supplements this basic concept, differing to some extent in the method of achievement. The foundation of transparency, according to Christianity, is the willingness to open ourselves to God, in all of our personhood, and to maintain that genuine relatedness through daily response to God's Spirit and precepts in the written Word. Openness to God leads in turn to transparent, caring relationships with others. If such interpersonal relationships do not exist we have decided ourselves as to our being open to and knowing God (I John 4:7-12).

These relationships of transparency are primarily maintainable as we replace inadequate and debilitating emotional defenses by self-acceptance rooted in God's unconditional love and acceptance of us as persons (though perhaps still unregenerate), because we are made in His image (Psalm 139:13-16). Use of these ego-defenses lead only to self-deception, hence sin, and disrupts our relationships with both God and our fellow man. According to God's Word we are to root our self-significance in the Love and Relationships which God has directed to man as His special Creation.

One of the ego-defensive tactics which modern man seems to employ frequently and which also seems to be a reflection of responsibility-relieving determinism, is the attempt to deny the responsibility for negative (moral) actions by blaming the guilt on others or on one's background. Such techniques of repression and projection rob men of the opportunity to grow, and are ultimately psychically and societally destructive.

*The hope of man is in the possibility of making decisions, and in the supreme decision of establishing and maintaining a relationship with God.*

Any notion of responsibility must grapple with the experience of guilt. It seems that man was not made to live with guilt. It causes disintegration and alienation. Blaming others or denying its existence do not remove real guilt, but simply prevents an honest acceptance of one's self with resultant transparency. Guilt, therefore, should be a signal for confession and restitution. It should not be lugged around unresolved . . . indeed it cannot be if one is to experience the freedom of transparency.

Some psychologists have severely criticized Christianity for the concept of sin and guilt.[12] They state that these notions are psychologically disintegrative—which they are—while ignoring the complementary concept of the restorative power of horizontal and vertical confession. It might be nice if we could abolish guilt, and act as we please, but if man is a moral creature, as Christianity states and history seems to support, we might better deal with the abolition of guilt through appropriate prevention and restitution.

Clearly, there is imagined guilt, as Freud suggested, which is the product of manipulative and narrow subcultural interests. This guilt is definitely destructive and unnecessarily binds persons. There is also real guilt, with real moral culpability, which is the product of the destructive transgression of God's commandments, according to Christianity. Thus, there *should* be the experience of guilt, it seems, if one murders another or commits adultery. These actions are basically disintegrative, egocentric, and destructive breaches of God's lawful and harmonious relationships. Indeed, persons who have no such moral sensitivity and do not experience the feeling of guilt for obviously destructive actions are designated as sociopaths by the psychologist.

Guilt, of course, does not refer solely to some heinous act of murder, but seems to apply to any intentional act which would alienate us from God and from one another. If we try to embezzle or cattily criticize another, or don't engage in an act of compassion when given the opportunity, we are choosing actions which in their egocentricity alienate us from loving, caring, growth relationships with God and fellow men. God calls such actions sin, and the experience of anyone indicates the kinds of interpersonal barriers and personal callouses which form if proper responsibility is not assumed.

God has provided us with a remarkable set of restorative tools in the respective acts of forgiving and confessing sin (guilt). In our increasingly mechanical world where man can seemingly escape becoming a hollow machine only by his loving and transparent embrace of personal I-Thou relationships, these acts are essential. The Illinois psychologist, O. Hobart Mowrer, has written extensively about the need for confession between human beings as the way to intra and inter-personal wholeness.[13]

In the Sermon on the Mount, we read that we are not to offer gifts of worship to God if we remember that we have wronged our brother, until we ask his forgiveness. By this cathartic act of humility we restore both our horizontal and vertical relationships. By removing the barrier of pride we become transparent and whole again.

The other side of the coin, given in Matthew 6, is that God will "forgive our trespasses (breaches of our relationship to God) as we forgive those who trespass against us." Such forgiveness is granted with the awareness that we are not better than our brother (Phil. 2:3). Such an attitude and action again prevents the establishment of disintegrative barriers which rob us of our wholeness and ability to be open. According to this verse, the implication is that if we don't voluntarily forgive those who have sinned against us we become as morally guilty as they are, because we prevent continued growth between ourselves as persons and God.

The refusal to ask for or to grant forgiveness also underlines a basically unhealthy ego-defense of a person who is not willing to see himself as he is, or must use manipulation to relate to others. In order to defend himself from exposure this nontransparent person usually engages in chronic criticism of others, verbally "murder-

**Three areas of complementarity between psychology and Christianity: (1) necessity of transparency for personal and interpersonal growth; (2) necessity to transcend a mechanical existence through the experience of Love in I-Thou relatedness; and (3) necessity for a sense of significance or positive self-esteem.**

ing" them. The irony, of course, is that the faults he sees in others are his own in disguise. The result is a person constantly in internal and external conflict who is unable to relate in a positively intimate, growth-producing manner to either other human beings or God. Such a person is indeed isolated, and even a profession of belief in God becomes questionable as to its reality (1 John 4:7-8).

The tragedy of this defensive posture is that such self-deception and non-transparency is an attempt to preserve one's integrity and establish himself as a significant, worthwhile human being . . . something which God has already assured us of unconditionally by his willingness to love us through the personal relationship of Christ.

This search for a base of self-significance or esteem, so critical to each individual and recognized as such by both Christianity and psychology,[14] becomes increasingly crucial in an impersonal and mechanistic world. Material accumulation and the ability to exercise power through manipulation or productivity have become major secular indices of personal worthwhileness. The result is an ever-spiralling pressure for the individual to produce and obtain material goods. The standard of self-significance has increasingly become *what* one has or does, rather than *who* one is as a person, apart from power and position.

When modern man's reference point becomes the mechanical, material world, and he is also told by naturalistic philosophy that he is simply a chance product of impersonal forces, he begins to lose the capacity to relate to other human beings in a growth-giving manner.[15] Indeed, through such object fixation, as divorce statistics seem to corroborate, other people are transformed into objects, satisfiers of immediate need which can be thrown away or traded in. The endurance needed to develop accepting and meaningful relationships with others seems archaic in a society devoted to the economy of planned obsolescence and object satisfaction.

Some men, however, have begun to sense that their fixation on superficial I-It relations is an embrace of death, leading only to alienation and loss of personhood. They have begun to suspect such a foundation can be neither satisfying or enduring because it is an attempt to gain significance by not facing one's human dilemma honestly. It is understandable that apart from a significant relationship to God, unable to find a reason for significance in a mechanical world, men begin to identify subtly with that which seems most significant and powerful. In the psychic frenzy of the search for some reassurance that he is, in fact, alive and worthwhile modern man proceeds to destroy himself in object relationships or in reaction to I-It relationships through equally non-growth oriented alternatives, such as the apparently autistic use of drugs, which ironically are also impersonal forces. Both of these instances are attempts to escape the psychic boredom and spiritual hollowness of secular man isolated from significance in God.

If, indeed, man's significance is foundationally related to an honest appraisal of his identity stemming from the context of being made in the image of God, these alternatives will not provide lasting worth. Nor will other reactive attempts at affirming Life, the natural response to recognition of the slow death inherent in the embrace of materialism. The natural response to the recognition that one is inwardly dying in this mechanical world is to affirm his aliveness through intense passion, demonstrated in acts of violence or in sexual preoccupation. Both acts seem to confer personal meaning, but each precludes the formation of intimate and enduring relatedness due to their manipulative and autistic character. They further alienate searching secular man from his only permanent source of Life and significance, because they are not founded upon the acceptance of an unconditional Love and personal relatedness. To many modern men, God seems dead but it is only because they have embraced alternatives of death in their separation from God and alienation from men.

Into this desperate search of modern man for significance, wholeness, and Life must come Christians as *persons* (not statistic counters), who are willing to accept and relate to their unsaved counterparts as *persons,* in a manner which is reflective of God's caring love. According to Christianity the base of each person's significance is rooted in the purpose and relationship engendered in each person's special creaturehood and released in the Personal Encounter of Salvation through the person of Christ. Each Christian must function, then, as a bridge, as an involved friend introducing an even more Involved Friend.

The contemporary Christian then must be aware of some of the psychic needs and motivations of his secular counterpart. He must try to understand others as persons and relate Christ to their whole person, through his own involvement as a transparent individual. Evangelism from a distance will not meet the desperate cry of modern man for his personhood.

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# The Psychologist-Christian

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*Very few writers have concerned themselves with the relationships between the profession of psychology and the Christian faith. After preliminary discussions on the nature of psychology and of Christianity, the relevance of being a Psychologist-Christian is considered. Five areas of integration between profession and faith are presented. The psychologist can express his faith intrapersonally, professionally or scientifically, experimentally, theoretically or interprofessionally. Illustrations of these various types of integration are reported. A final critique evaluates the validity of this model and suggests that in the last analysis, Psychologist-Christians are those who claim the designation. Behavioral indices of faith may inevitably fail to identify such persons.*

What relevance does being Christian have for one's daily work? This question has been considered for a number of jobs and professions. Among them are medicine (Stephens and Long, 1960), business (Johnson, 1964), education (LeFevre, 1958 and Palikan, 1965), science (Barbour, 1963), farming (Wentz, 1967), real estate (Wentz, 1967) and architecture (Wentz, 1967). Others have considered the relationship of faith to the practice of counseling (e.g., Roberts, 1950; Hoffman, 1960; and Mowrer, 1961) and psychiatry (Knight, 1964). Little has been written about psychology. This essay intends to remedy this situation by considering the relevance that being Christian has for the daily work of the psychologist.

**Who are the Psychologists?**

Psychology is comparatively new. Although Melanchthon coined the term "psychology" in the early 1500's (La Pointe, 1970), it was not recognized as a discipline separate from philosophy until the late 1800's. Wilhelm Wundt established the first psychological laboratory in 1879 at the University of Leipzig. By the end of the next decade James McKeen Cattell had been appointed the first Professor of Psychology in America and Joseph Jastrow had been awarded this country's first Ph.D. degree in Psychology. Before the turn of the century William James had written his popular *Principles of Psychology* (1890), the American Psychological Association (APA) had been organized, and the first psychological clinic had been opened.

Psychology has grown rapidly. The APA began with 31 persons. It now includes over 25,000 members. The National Science Foundation reported in 1968 that approximately one in twelve scientists was a psychologist. Many students aspire to careers in psychology as is evident by the more than 2000 doctoral and 5000 masters degrees in psychology awarded each year (APA, 1970).

There have been numerous attempts to define psychology. One widely agreed upon definition is that psychology is that ". . . scholarly discipline, . . . scientific field, and . . . professional activity which studies animal and human behavior" (APA, 1970, p. 3). Behavior is defined as the physiological reactions, the feelings, the thoughts, the words and the actions of people and animals. Normal, abnormal, individual and interpersonal behaviors are of interest to psychologists.

Psychology has become a scholary discipline in that the principles of behavior are a major field of study in colleges and universities. Psychology has become a science in that it utilizes research methods to investigate behavior and draws conclusions on the basis of empirical results. Psychology has become a profession in that it applies its knowledge of behavior in efforts to resolve individual and social problems.

Clark (1957) notes some of the procedures psychologists have used to study behavior since the turn of the century.

> These years have seen both complete reliance on introspection and the complete abandonment of it; a rejection of thinking as a proper part of psychology, and the claim that it is critical to understanding behavior; a complete faith in tests and other objective measures, and a swing away from all measurement; a bandwagon for the conditioned reflex and a strong plea for putting purpose back into the animal; a stress on the use of large Ns (numbers), and a strong swing to studies of small group behavior; a strong antipathy to the idea of the unconscious, and development of projective tests, hypnosis, and other depth analytic methods; a one-time preference for laboratory work has shifted as psychologists now predict presidential elections and run daily columns on child development, obtain information on racial and religious differences, and conduct action research (p. 20).

This paper is the first chapter in a book by the same title, edited by Dr. Malony.

The diversity has been and still is tremendous.

However, modern psychology is unified in that it possesses a vast literature on individual and social behaviors, a broad understanding of human development from infancy to old age; many techniques for working with individuals and groups; much new knowledge about physiological functioning; refined mathematical and statistical techniques and numerous methods for applying its knowledge to industry, society and education (Clark, 1957).

While all psychologists obtain the MA or PhD degree, they have varied interests and skills and they work in many different types of locations. They can be found in schools, colleges and universities, clinics and hospitals, governmental and welfare agencies, industry and business and in the public health service. Some are even self employed.

The wide variety of psychologists can be seen in the thirty-one divisions of APA. Among them are the divisions of clinical, counseling, experimental, educational, school, industrial, social, engineering, and physiological psychology.

The largest single group of psychologists are known as clinical psychologists. They comprise 29% of the total membership of the APA. The term "clinical" was coined in the early 1930's by Ligntner Witmer to designate a type of psychologist who works with persons in the assessment and resolution of their emotional and adjustment problems. Thus most clinical psychologists are professsionals in the sense that they apply principles of behavior. They are not psychiatrists as some have presumed them to be, however. They use non-medical means, such as counseling and behavior modification, to change behavior and to solve people's problems. Clinical psychologists often function also as academicians and scientists. They teach and conduct research. Many have several part time jobs in which they relate their professional, scientific and scholarly interests. They are most often found in schools, hospitals, mental health centers, colleges and in private practice.

Another significant group of psychologists are known as experimental psychologists. They function most often as scientists and academicians. While it is true that all psychologists are experimental because they have been trained as scientists, the term is frequently reserved for those who conduct basic research in behavioral processes. Most often, this is done in the laboratories connected with academic institutions. Nevertheless, many experimentalists are becoming somewhat professional in that they are consulting to businesses and to industries. For example, the design of industrial machines to best fit the capabilities of the men who run them is known as the field of engineering psychology. Most engineering psychologists are experimental psychologists functioning in a professional role.

Numerous other types of psychologists could be discussed. However, there is a growing opinion among psychologists that there is in reality only one type of psychologist, not many. While their interest in various areas of behavior may differ, they are all in agreement that the empirical study of basic behavioral processes provides the foundation for applied efforts to change behavior. Further, while a given psychologist may spend more or less time in consultation or basic research, they all retain primary interest in persons and their problems.

In summary, psychologists are academicians, scientists, and professionals who attempt to understand and influence behavior in all its manifestations. While men have always studied each other's actions, psychology has only recently been recognized as a separate discipline and thus persons known as psychologists have been in existence only a little more than 75 years.

### Who are the Christians?

Just as there have been numerous attempts to define psychology, so have there been many definitions of Christianity. Perhaps the simple assertion that a Christian is one who has faith in Jesus Christ would receive common approval even if there was disagreement over its implications. The early Christian word for "fish", *Icthus,* sums up this definition. The letters stand for a simple statement of faith that He is "Jesus Christ, Son of God, Saviour."

*Psychologists are academicians, scientists, and professionals who attempt to understand and influence behavior in all its manifestations.*

There would probably also be wide agreement with the statement that a person's Christian faith should have an effect on what he does. Being a Christian involves, therefore, action as well as belief. The belief or faith in Jesus Christ supposedly influences the actions and daily work of the Christian. This is as it should be in spite of the fact that Wentz (1963) and others have reported over half their samples indicate no felt relationship between their faith and their business life. The Christian life involves an important emphasis on behavior as well as faith. The Christian is one who *has* faith and *does* work. The rhythm of the Christian life moves back and forth between worship which renews faith and work which expresses faith. ". . . . the Christian finds himself moving between his sources in Christ and his services in the world." (Wentz, 1963, p. 66)

The emphasis is subsumed under the Christian doctrine of "Vocation" or "Calling". In times past, Calling has been a term applied only to those who became ministers or pastors. This is a misunderstanding of the issue. It is the Christian conviction that all men are called to live by their faith in God through Christ which gives them the understanding that they are children of God. This is the Christian calling. All men are called to the Christian life. As LeFevre (1958) suggests:

> Christians are "called". They are called to the Christian life, to a Christian vocation in a larger sense, at the same time that they may feel themselves to be called to some specialized vocation such as law, medicine, preaching or teaching. A particular profession can be a calling from God only because it is possible to exercise the more general calling, that of living the Christian life, within it. (p. 14)

Thus the Christian Vocation is the same for every man. It is a Vocation of living life as a child of God in whatever occupation that may be.

Four Biblical metaphors which have been used to describe the vocation of the Christian are: Servant, Light, Salt and Soldier. They are offered here as a possible model of our later discussion of the Psychologist-Christian.

Jesus pictured himself as a servant and often encouraged his followers to follow him in serving their

fellow men (Mark 10:43-44). Thus, the first way of working out one's calling is to be a servant. Matthew 25:40 explicitly suggests that to meet the needs of a neighbor is to serve God. To be a servant includes several facets. Philippians implies it should include a love for people, require sacrifice of oneself, be based on identifying with the needs of others and result in direct help (Wentz, 1963).

The second metaphor for Christian action is "Light". "You are the light of the world", Jesus told his followers (Matthew 5:14). The implication is that the Christian by his goodness is to lead others to faith in Christ. It implies that the Christian will behave in such a manner that others will admire him and/or inquire as to his motives. In all things and experiences he will relate himself to his faith. He will attempt to live out or incarnate the implications of his faith. As Wentz (1963) suggests "the layman ministers by relating secular things to God . . . His actions try to show that Christ's death has somehow made these things look different." (p. 98)

"Salt" is the third term for Christian behavior. Jesus told his followers they were the "salt of the earth" (Matthew 5:13). Salt suggests seasoning. Seasoning makes food taste better by permeation. The emphasis here is on active participation in the world. Thus, the Christian is not ascetic but secular in the fullest sense of the word. He is involved and enthusiastic in non-religious affairs outside the Church. Like salt scattered over meat, so Christians are dispersed over the activities of the modern world. In the daily events of home, work and play the Christian will be found actively involved in witnessing to his faith. In these events the Christian will be working toward making things become as they should be.

The last metapor for the Christian life is that of "Soldier". (II Timothy 2:3-4) Soldiering involves active efforts to make Christ Lord of activities and situations. It also involves a willingness to suffer when success does not come easily. This aspect of the work of the Christian implies that one is in tension with his environment and is engaged in a struggle to change things. The old hymn "Onward Christian Soldiers" speaks of many of these issues. The soldier of Christ encounters the world and joins his fellows within the Church in changing the world in the name of Christ.

*Both the first and second presidents of the American Psychological Association studied for the ministry before becoming psychologists.*

These four, therefore, are qualities of the Christian's behavior. They are metaphors rather than concrete prescriptions because the precise acts of Christians are impossible to predict. This difficulty is similar to the question of whether Christians can be found in this or that occupation. It is now agreed that all Christians are called to live the Christian life and that any occupation which allows a person to exercise his calling as a child of God is acceptable. This was certainly Martin Luther's intent in his doctrines of "vocation" and the "priesthood of all believers." Work is what Christians do to fulfill their calling.

This suggests the specific concern of this essay, namely, what relevance does being Christian have for the daily work of the psychologist? What does it mean to be a Psychologist-Christian?

## Who are the Psychologist Christians?

Whether or not one is Christian might be expected to influence his choice of and his work within his chosen occupation. Clement (1969) has proposed five ways in which the Christian faith could be expressed in the life of a psychologist. He suggested that the psychologist could integrate his faith (1) intrapersonally (2) professionally or scientifically; (3) experimentally; (4)theoretically; and (5) interprofessionally. These provide a convenient model for considering the ways in which being Christian might influence the vocation of being a psychologist.

(1) *Intrapersonal integration* refers to the influence of faith on vocational choice and on beliefs. As Christians, it is important for persons to feel that by becoming psychologists they can obey God's call to be His children. As LeFevre (1958) notes:

> Should we feel that we could no longer be Christians within our particular profession or that we could better exercise our responsibility as Christians within another calling, other things being equal, we would feel a strong inward pressure to relinquish our present work and to seek some other. (p. 14)

Thus, we expect to find persons who in part chose to become psychologists because it was a means by which they could fulfill their Christian calling.

Another aspect of intrapersonal integration would be in the area of personal belief. One would expect to find among Psychologist-Christians persons for whom faith continues to be a live option and persons whose faith is well integrated with their learnings in psychology. While their faith is not free from doubt, they nevertheless have come to some basic resolution of the science-religion issues. Their faith is "mature" in the sense that Allport (1960) indicated. He suggested mature faith included a "unifying philosophy of life" which consciously integrated all of one's experience. Such is the character of the faith of the Psychologist-Christian who attempts intrapersonal integration.

One gross indication of this concern might be previous theological training prior to the study of psychology. Both the first and second presidents of APA, G. Stanley Hall and G. T. Ladd, studied for the ministry before becoming psychologists. Contemporary psychologists such as Adrian Van Kamm, Carl Rogers and Rollo May have also had theological training. In a soon to be published survey, Vayhinger and Cox (1970) found 392 members in the 1963-1966 Directories of APA who had received theological degrees. This was just under two percent of the total membership. The present author assessed the degree to which these psychologists with theological training were represented in the various Divisions of APA. Table 1 reports these results for a five percent random sample of seventeen of the Divisions.

It is to be noted that psychologists normally belong to more than one Division and that the above data are not controlled for this confounding. Also, the Divisions were grouped into thirds depending on the relative number of psychologists having had previous theological training. The respective percentages of psychologists having had such training in the highest, middle and lowest groups of Divisions were 5.00%, 2.78% and 0.04%.

**TABLE 1**

*Incidence of psychologists with previous theological training among members of seventeen APA Divisions.*

| Division | No. in Div. | No. in Sample | Psychologists with Previous Theological Training (%) |
|---|---|---|---|
| HIGHEST THIRD | | | |
| Teaching | 1773 | 115 | 5 (4.34) |
| Personality-Social | 3086 | 199 | 5 (2.51) |
| Clinical | 2905 | 143 | 6 (4.20) |
| Educational | 2107 | 106 | 7 (6.60) |
| Counseling | 1479 | 74 | 6 (8.12) |
| Sub Total | 11350 | 637 | 29 (5.15) |
| MIDDLE THIRD | | | |
| Evaluation-Measurement | 828 | 48 | 1 (2.08) |
| Physiological-Comparative | 510 | 27 | 1 (3.70) |
| Consulting | 510 | 25 | 1 (4.00) |
| Industrial | 834 | 40 | 1 (2.50) |
| School | 847 | 41 | 1 (2.44) |
| Psychotherapy | 1021 | 51 | 1 (1.96) |
| Sub Total | 4550 | 232 | 6 (2.78) |
| LOWEST THIRD | | | |
| Experimental | 1061 | 56 | 0 (0.00) |
| Developmental | 810 | 45 | 0 (0.00) |
| Psychological Study of Social Issues | 1405 | 72 | 0 (0.00) |
| Public Service | 497 | 25 | 0 (0.00) |
| Military | 334 | 17 | 0 (0.00) |
| Engineering | 360 | 27 | 0 (0.00) |
| Sub Total | 4467 | 242 | 0 (0.00) |
| GRAND TOTAL | 20307 | 1111 | 35 (2.49) |

An analysis of these differences indicated that the lowest group differed significantly from the middle and highest but that these latter two did not differ significantly from each other.

The Division groupings are of interest. There is a tendency for more service-oriented psychologists to have had theological training. However, this inference is not entirely appropriate in light of such Divisions as Teaching, Personality-Social and Evaluation-Measurement among those with higher incidence of theological training. Again, such Divisions as that of the Psychological Study of Social Issues and Psychologists in Public Service are among those with the least incidence of such training.

The overall average of 2.4% is similar to the 2% figure of Vayhinger and Cox (1970).

Concerning personal faith, Vayhinger and Cox (1970) found that the majority of the 246 who returned questionnaires considered themselves to be psychologists with theological training rather than vice versa. Thus, their primary role identification was with psychology. Yet their religious concern was shown by over 80% of them indicating interest in the relationship of psychology and theology. 62% had retained membership in their denominations and 90% were active members of local churches. While the data are not conclusive, they do suggest that among these psychologists there is a continuing concern with faith and an interest in relating their faith to their new learning in psychology.

No doubt we would make a serious correlation-causation error if we assumed that we had selected all the Psychologist-Christians merely by relying on previous theological training. There are many Christians who enter psychology without studying theology first. By examining academic background we can at most say that at one time the issues of faith were important enough to a given person for him to spend time in serious study of them. That there are others to whom faith was of equal importance and who did not pursue such study cannot be denied. At best, it could be assumed that for many Christians, psychology becomes that culturally prescribed channel through which they dynamically resolve the conflicts of their development and express the tenets of their faith. This is Erikson's (1958) view of vocational choice and personal integration wherein a person finds himself and his God through socially acceptable work. Our method of relying on academic background is obviously weak in detecting such persons. Ideally, the autobiographical method would be best since the resolution and expression of these issues is so unique.

Very little of a confessional nature has been written by psychologists. Meehl, et. al. (1958) probably comes closest to being an affirmation of the faith of a psychologist, although, even here, the authors who are psychologists are not clearly distinguished from those who are theologians. In regard to the possibility of relating Christianity to psychology, both Havens (1964) and Pruyser (1968) note the necessity of taking the participant's frame of reference and of at least admitting the possibility of there being a God for valid research in the psychology of religion. Thus, the psychologist who is a believing Christian should have a distinct advantage over non-believing psychologists who also seek to understand religion. His efforts will be "faith seeking understanding" as Augustine says, and will have a greater possibility of being valid. In the 80% of the psychologists in the Vayhinger and Cox (1970) survey who expressed continuing interest in relating psychology and theology, we would probably find sincere ongoing efforts at this type of intrapersonal integration.

The metaphor that comes closest to expressing this type of integration is that of Light. His personal faith remains vital to him as he chooses psychology as an avenue for expressing his calling to be a child of God. He, thus, has motivations which bring new insight or light into his life. Possibly others see this and inquire of him regarding it.

(2) The second type of integration of faith and vocation suggested by Clement (1969) is in the *practice* of one's vocation. Since psychology has been designated a profession, a science and an academic discipline, this means integration of the Christian faith with professional tasks, scientific endeavors, and scholarly activities. This pertains to the influence of faith on activities within a vocation.

No doubt the classic metaphor for day to day activity within the Christian life is that of Servant. Other people and their needs are important. The Christian is to respond to others by being good to his neighbor, i.e., by loving mercy and doing justly (Micah 6:8). This is Christian service. The actual meaning of this on the job becomes the problem, for as Barbour (1960) said, "Being a Christian geologist does not mean finding oil on church property. It means serving God and man in the daily work of geology." (p. 11) Certainly the same is true for psychology.

At one level, working in a religious setting such as a church college or hospital or seminary could be considered an example of this type of integration. In order to assess the incidence of such vocational placement among psychologists, a 5% random sample of the membership of seventeen of the Divisions of APA was surveyed. Table 2 is a report of this survey.

**TABLE 2**

*Incidence of psychologists working in religious setting among seventeen divisions of the American Psychological Association* (1968).

| *Division* | *No. in Div.* | *No. in Sample* | *No. working in Religious Setting (%)* |
|---|---|---|---|
| Clinical | 2905 | 143 | 7 (4.89) |
| Consulting | 510 | 25 | 11 (4.00) |
| Counseling | 1479 | 74 | 0 (0.00) |
| Developmental | 810 | 45 | 5(11.11) |
| Educational | 2107 | 106 | 6 (5.66) |
| Engineering | 360 | 27 | 0 (0.00) |
| Evaluation-Measurement | 828 | 48 | 2 (4.16) |
| Experimental | 1061 | 56 | 0 (0.00) |
| Industrial | 834 | 40 | 0 (0.00) |
| Military | 334 | 17 | 2 (6.06) |
| Personality-Social | 3086 | 199 | 13 (6.53) |
| Physiological-Comparative | 510 | 27 | 2 (7.41) |
| Physiological Study of Social Issues | 1405 | 72 | 2 (2.77) |
| Psychotherapy | 1021 | 51 | 2 (3.92) |
| Public Service | 497 | 25 | 0 (0.00) |
| School | 847 | 41 | 0 (0.00) |
| Teaching | 1773 | 115 | 6 (5.21) |
| TOTAL | 20,307 | 1,111 | 48 (4.32) |

Again, the above results are confounded by the multiple appearance of psychologists on the various membership lists. Nevertheless it does appear that about one in twenty-five psychologists does work in a setting which could be considered religious. These vary from veteran's social service organizations under the auspices of a religious body to church related colleges and universities. As would be expected there were no such placements among Engineering, Industrial, Military, or Public psychologists. However, it is puzzling why there were none among Counseling and School psychologists. There is a vast network of parochial elementary and secondary schools in the United States and there are numerous church-sponsored counseling centers. It could be that many with these interests are pursuing membership in other professional groups such as the American Association of Pastoral Counselors.

In the Vayhinger and Cox (1970) survey over 27% of those with previous theological training were counselors or professors in religious settings. Thus there is a much greater tendency to work in a religious setting if one has had theological training than if one has not. In the present survey, it is of interest to note the variety of types of psychologists working in religious settings. They range from Physiological-Comparative to Personality-Social to Developmental Psychologists. A cursory survey indicated that many of them were instructors in church related colleges and universities.

Of course, the content of a man's work is probably more important than the context. What the Psychologist-Christian does is more crucial than where he does it. Further the integration of faith and profession should refer to the teaching, consulting, and researching activities of psychologists as well as to the more obviously service related tasks of counseling.

Clark (1957) reports that while many students enter graduate study in psychology with the thought of helping people, they often become interested in other roles such as research and teaching. Many psychologists combine clinical, research and academic tasks. Within their persons they exemplify the tripartite nature of psychology as a profession, a science and an academic discipline. The integration of faith with practice should apply to these teaching, researching and consulting activities as well as the more obviously service tasks of counseling.

The day of valueless counseling is over. London (1964) points out that all psychotherapy has its "morals". The Psychologist-Christian will certainly be interested in helping people but will also be concerned with what types of persons they become in the process. This has implications for many of the critical incidents of psychotherapy such as tendencies toward suicide, confidentiality, and decisions which affect others. How the Psychologist-Christian behaves with reference to these cannot be explicitly stated, but that he will relate his faith to his decisions is a foregone conclusion. This is true in spite of London's (1964) assertion that "psychotherapists must finally appeal to science to justify these activities, just as ministers appeal to revelation." (p. 130).

A further issue in this regard is the relationship of the search for self-understanding in counseling to the Christian view of life. Roberts (1950) and Tillich (1952) are theologians who have considered these issues. Tweedie (1961, 1963) is illustrative of psychologists who have written on these matters. He has explicitly related the thinking of Viktor Frankl's Logotherapy to the Christian faith and has indicated how he attempts to integrate persons' search for meaning with the communication of the gospel. Relating faith to clinical procedures is, thus, a concern to numerous Psychologist-Christians.

The teaching of psychology is usually done at the undergraduate level. While there is a great need for psychologists in church-related institutions of higher learning and while we have noted that many theologically trained psychologists work in such settings, most Psychologist-Christians do not work in these situations. They teach instead in state-supported or non-religious private schools. How personal faith influences teaching practice is a critical question. LeFevre (1958) suggests faith should affect the method and the assumptions with which the professor works. He notes Allport's concern for the "total person" and suggests the Christian teacher will not reduce man to less than he is or imply that a full understanding of man can be had with stimulus response, cause-effect principles. While LeFevre may over-simplify the issue, he is probably correct in suggesting that the Psychologist-Christian teacher will present his material in light of a view of man which sees man as self conscious, free, goal directed, value determined and capable of response to God. Many of the humanistic psychologists make these assumptions even though they may not state them in theological terms (cf. Rogers, 1961; Jourard, 1963).

Concerning research, several points can be made. First, the traditional distinction between pure and applied science is no longer seen as a dichotomy but as a continum. Basic research is much more easily perceived as providing the foundation for later applications of psychological principles to human problems. Thus the Servant motivation of the Psychologist-Christian can be implicit in expermentation that has no obvious connection with social or individual problems if that research can be conceived as providing knowledge for later use in solving these problems. A concern for

*The integration of faith and profession should refer to the teaching, consulting, and researching activities of psychologists as well as the more obviously related tasks of counseling.*

service to persons would be implicit or explicit.

However, it could be that knowledge for knowledge's sake is itself a worthy goal for the Psychologist-Christian. As Barbour (1960) asserts, "The Christian is called not only to serve human need but to seek truth." (p. 39). This is based on the faith that nature is God's creation and that man is to have dominion over all things on earth. The search for truth, regardless of whether it has practical meaning, is thus part of having dominion through understanding. Knowing how God made man is one way of knowing the will of God for man. In this regard, it is interesting to consider the possibility that some psychologists may elect to work in a secular rather than a religious setting because of their Christian conviction that in the secular setting they have more resources and equipment for finding truth than in a religious setting. This often is true because of the church's limited facilities and resources. LeFevre (1958) writes about the responsibility of the Christian intellectual to be more than adequate in his chosen field of study. Therefore, the strenuous search for truth with the best tools available can easily be considered a Christian task.

The metaphor of Soldier probably best fits this activity of the Psychologist-Christian in that he is actively pursuing through research and study the God-given task of transcending the world through knowledge which makes man less subject to finitude and makes him more able to relate to the divine.

Finally, psychology has been concerned with the rights of persons who served as subjects in research projects (APA, 1967). The issues of manipulation, harmful results, secrecy, and deception have been of concern. While ethics and values are by no means solely Christian virtues, the Psychologist-Christian conceives of others as valuable children of God and thus no doubt takes seriously the dignity of persons in his investigations.

Overall, the integration of faith in professional, scientific and academic practice can be understood through the metaphor of Salt. In a wide variety of tasks the Psychologist-Christians attempting this type of integration are, indeed, seasoning their situations with their faith.

(3) Integration through *research* in the psychology of religious behavior is a third means by which the influence of faith might be expressed in the work of the psychologist. There is a long tradition of such interest beginning with G. Stanley Hall's extensive surveys of religious conversions in adolescence (1891, 1904). William James provoked enough interest in the field with his 1902 Gifford lectures for a *Journal of Religious Psychology and Education* (Hall 1905) to be published. Dittes (1969b) reports that almost one fourth of APA's presidents have evidenced concern with the study of religion at some point in their careers. Interest in this area underwent a demise, however, in the twenties and thirties according to Strunk (1971) who wrote a historical survey of the field. Religion became a taboo topic (cf. Douglass, 1966). The survey reported in Table 3 below seems to indicate that interest in the psychological study of religion is still at a low ebb. The seventeen APA Divisions referred to before are sampled for the listing of religion as an interest area in 5%-random samples of their memberships.

Overall about 1.3 psychologists in 100 express interest in the psychology of religion. There do appear to be significantly greater percentages of psychologists in such divisions as Teaching, Personality-Social, Physiological-Comparative, and Public Service. These are combinations which do not seem to have logical relationships. Even here expressed interest is rare and appears in less than one in twenty psychologists.

A possible explanation for this dirth of listed interests among psychologists is that these interests might be subsumed under other areas. Hiltner (1959) and Gregory (1959) noted that interest in the psychology of religion in the early part of the century became, in part, divided into the religious education and pastoral counseling movements. Thus, we might find concern for the psychological study of religion subsumed under educational psychology, counseling or developmental psychology. Further, it might be subsumed under personality or social psychology. This division evidenced one of the higher incidences of such interest in the above survey. Finally, philosophical psychology or cognitive processes might be the listed area under which an interest in psychology and religion might be subsumed. Pruyser (1968) illustrates the latter point in his discussion of basic processes (e.g., cognition and emotion) in the religious experience.

**TABLE 3**

*Incidence of psychologists reporting interest in religion among 17 APA divisions.*

| *Division* | *No. in Division* | *No. in Sample* | *Psychologists Reporting interest in religion.* |
|---|---|---|---|
| HIGHEST | | | |
| Teaching | 1773 | 115 | 5 (4.34) |
| Personality-Social | 3086 | 199 | 4 (2.01) |
| Clinical | 2905 | 143 | 1 (0.69) |
| Educational | 2107 | 106 | 2 (1.89) |
| Counseling | 1479 | 74 | 6 (8.12) |
| Sub Total | 11350 | 637 | 11 (1.79) |
| MIDDLE | | | |
| Evaluation-Measurement | 828 | 48 | 0 (0.00) |
| Physiological-Comparative | 510 | 27 | 1 (3.70) |
| Consulting | 510 | 25 | 0 (0.00) |
| Industrial | 834 | 40 | 0 (0.00) |
| School | 847 | 41 | 0 (2.44) |
| Psychotherapy | 1021 | 51 | 0 (1.96) |
| Sub Total | 4550 | 232 | 1 (0.62) |
| LOWEST | | | |
| Experimental | 1061 | 56 | 0 (0.00) |
| Developmental | 810 | 45 | 0 (0.00) |
| Psychological Study of Social Issues | 1405 | 72 | 1 (1.38) |
| Public Service | 497 | 25 | 1 (4.00) |
| Military | 334 | 17 | 0 (0.00) |
| Engineering | 360 | 27 | 0 (0.00) |
| Sub Total | 4467 | 242 | 2 (0.90) |
| GRAND TOTAL | 20307 | 1111 | 14 (1.10) |

Yet, there is evidence for a renewed concern in the 1960's. There are several organizations which are stimulating research and writing within this area. They are: The Society for the Scientific Study of Religion, The Catholic Psychological Association, The Lumen Vitae International Commission of Religious Psychology, The Christian Association for Psychological Studies, and the Internationale Gesellschaft Für Religionspsychologie. A symposium on religious psychology was reintroduced into the program of the Fifteenth International Congress of Psychology in Brussels (1957) after an absence of 30 years. In 1961 the *Journal for the Scientific Study of Religion* began publication. A new group, Psychologists Interested in Religious Issues, has recently been formed.

Some contemporary researchers in this area are Strunk (1958), Clark (1969), Allport and Ross (1967) Gorsuch (1968), King (1967) and Spilka, Armates, and Nussbaum (1965). Strunk (1958) investigated motivations in the choice of a religious vocation. Clark (1969) studied the relationship of drug experiences to religious experience. Allport and Ross (1967) compared prejudice with the type of value religion had for a person. Gorsuch (1968) analyzed adjective descriptions of God. King (1967) attempted to measure the religious dimension. Spilka, Armatas and Nussbaum (1965) factor analyzed the concept of God. Godin (1965) gathered together several studies on religious development and Argyle (1958) summarized the research on the differences among the people who participate in religious activities. These efforts could be conceived as "faith seeking understanding" in the words of Augustine. The behavior of these Psychologist-Christians could be understood under the metaphor of Light in that they illuminate religious experience through their efforts.

(4) A closely related type of integration to research in the psychology of religion is conceptual *theoretical integration*. Theologians such as Tillich (1952) and Outler (1954) addressed themselves to this, but few psychologists have done so. Among those who did were early writers such as William James (*The Varieties of Religious Experience*, 1902) and G. Stanley Hall (*Jesus the Christ in the Light of Psychology*, 1917). Through the years others have written on these issues (e.g., Leuba, 1912; Thouless, 1923; MacDougall, 1934; and Clark, 1958). More recently Finch (1967) has attempted an explication of psychological theory for the Christian view of man and Mowrer (1961) has analyzed the distortion of theology by psychological theory. Further, other writers have considered religious myths and guilt (Pruyser, 1964, 1965), religion and existentialism (Royce, 1962), mental health and salvation (Rogers, 1968), and the relations between psychological and theological methods (Havens, 1968). Oakland (1969) and Van Kaam (1964) have related personality development to religion. These are indices of how a psychologist might express his faith through conceptual or theoretical efforts to integrate his faith and his science. Theorizing, like research, requires interest as a motivating factor. As has also been said in regard to research, the metaphor of Light is appropriate here, too, as indicative of the type of Christian action involved. This is also faith seeking understanding.

(5) The last mode of integration is that of *interprofessional relationships*. This refers to relationships psychologists have with religious institutions and religious professionals. For example, this is exemplified by a willingness to consult with churches and to confer with pastors. Many ministers refer persons to psychologists for counseling. There are numerous instances where the psychotherapy of the psychologist complements the pastoral counseling of the minister. Cooperative endeavors in church-counseling centers are also quite typical. The Church Federation of Greater Chicago Counseling Center is illustrative. Psychologists are frequently asked to consult with the boards and agencies of denominations.

*Ideally, the vocation of psychology should be an expression of faith for the Christian person who chooses this vocation.*

I have described several ways in which psychologists might consult with and be of service to pastors and churches (1970a). In a subsequent article, I have proposed a model for interprofessional relationships between the psychologist and the church (Malony, 1970b). In brief, psychologists can either consult or collaborate with the church on problems in thoughts, feelings, words or actions of persons in the life of the church in efforts of amelioration or education. No doubt, many of the problems of church life are amenable to interprofessional cooperation between a sympathetic psychologist and an open minded pastor or religious leader.

Some psychologists have tried to analyze church behavior through psychological categories. Dittes (1967) has written a psychodynamic understanding of the ebb and flow of administering the program of the church while Hites (1965) has summarized the principles of behaviorism as they apply to the tasks of church workers. Barkman (1969) analyzed motivations for missionary service among college students. These are forms of indirect interprofessional integration of psychology and religion.

Further, numerous psychologists have been involved in direct vocational counseling for the ministry (e.g., Hunt, 1966). Webb (1968) has constructed an inventory designed to guide students into areas of interest within the ministry. Many studies have been done on ministerial effectiveness and the personality dynamics of ministerial leadership (cf. Menges and Dittes, 1965; Malony, 1964). Dittes (1964) and others have expended much research effort in the construction of *The Theological School Inventory* (1962) which is widely used as a guidance tool in theological seminaries.

The metaphor that best fits this type of integration is that of Servant because here the psychologist uses his skills in service to his faith.

In summary, there are many ways in which the faith of the psychologist can influence his behavior. Five possible modes of relating faith and the profession, science and scholarly discipline of psychology have been discussed. Intrapersonal professional, experimental, conceptual and interprofessional modes of integration have been mentioned.

## Conclusion

Some final comments are in order. This essay has dealt with the problem of relating faith to vocation among psychologists. Ideally, the vocation of psychology should be an expression of faith for the Christian person

who chooses this vocation. Thus, the title of this paper, *The Psychologist-Christian,* was selected to emphasize the primacy of faith. The four metaphors of Salt, Soldier, Servant and Light were offered as types of faith expression. A number of possible behavioral indices of these metaphors were suggested. The critical question is, "Has this essay fully enumerated these behaviors or even determined the necessity of one of the listed behaviors for the life of the Psychologist-Christian?" While I feel that this esay has some logical and face validity, in the final analysis I think the answer to the above question must be "No" for three reasons.

First, the ideas of Bonhoeffer (1955) among others regarding "religionless Christianity" have influenced many persons. Many intellectuals, psychologists among them, have become impatient with organized religion. Thus, they may have intentionally chosen to be overtly non-religious out of Christian conviction. This is paradoxical. Dittes (1969a) wrote about these "religious Nones" and indicated they would assume increasing importance in the decade to come. These persons who express their faith in non-religious ways would not evidence integration of the type referred to in this essay but might at the same time be Psychologist-Christians. They might not be churchmen, work in religious settings or show interest in the psychology of religion, etc. They might be functioning in positions far removed from organized religion but be believing persons nevertheless.

Second, there always remains the problem between behavior and motivation. Jesus himself spoke of foolish generations which seek after or look for signs. Smith (1966) represents some modern theologians who suggest that ". . . the manifestation of faith is not simple, but dialectical" (p. 55). By dialectical they mean that the inference from behavior to motive is not simple and may in fact be absolutely false. For example human intentions always fall prey to the capriciousness of human life. Therefore, it may be impossible for a man to express his faith in many ways this essay has mentioned. More importantly, the Christian faith is itself an affirmation of hope in the face of meaninglessness. Therefore faith may be present more in weakness than in strength and more in the absence of a manifestation than its presence. Christian theology has noted that the forgiveness of sin is a greater reality than the power to express one's faith. This does not mean believing men should resign themselves to antinomianism or libertarianism. Nevertheless it is a recognition that the absence of an overt sign of relationship between the Christian faith and the life of the psychologist may not indicate a lack of faith at all. Thus, our overt indices would be insensitive to these dialectical distinctions. We might find Psychologist-Christians witnessing to their faith in the way they handled failure or suffering; in their persistence at humdrum tasks and meaningless duties; and in their humane solutions for administrative and research problems.

Finally, Allport (1942), among others, insisted on the importance of "personal documents" in understanding the vital issues of personality. These methods included a heavy reliance on autobiographical self-reports as opposed to inferences based on objective behaviors. Instead of judging overt indices of faith one would need to inquire of a given psychologist as to his own unique expression. The implication is that ultimately a man's behavior makes sense to him irrespective of its consistency in the eyes of others. As Allport insisted, true laws are idiosyncratic, i, e., personal. Comparison of a man to others or to standards is far less important than assessing the degree to which he sees himself as integrated around his values. The Psychologist-Christian, therefore, may best be understood from within or by listening to him reflect on the relationship of faith and vocation in his own terms. This is not to reject observable criteria for the relationship. It is simply to confess our methodological inadequacies and to allow ample room for unique interpretations. No doubt autobiographies are the best method for accomplishing this goal and such gross measures as have been discussed herein must pale in importance in comparison to such data.

In conclusion, there is a need to reaffirm confidence in the effect of faith on daily work. As has been suggested earlier, in the Christian faith:

> "Calling" or "vocation" means primarily the call to acknowledge a relationship to God, and to live in responsible obedience to him wherever one is. Hence it also means a call to a particular task, and response to God in one's daily work. (Barbour, 1960, p. 13)

The Christian lives his life as a response. If, by chance, he is a psychologist, that part of his life will be no different. It, too, will be a response and, thus, the activities he engages in will be influenced by his faith. Argyle (1958) states:

> The beliefs of the psychologist cannot affect his findings unless he actually cheats, so that there is no special kind of psychologist known as a "Christian Psychologist" —that would simply be a psychologist who happens to hold certain beliefs. (p. 1)

While by no means suggesting that cheating could characterize the Psychologist-Christian, this essay takes issue with Argyle and asserts that the "simple holding of certain beliefs" about Jesus Christ will have distinguishable influences on his behavior.

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# Behavioral Psychology in Christian Perspective

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*The philosophical assumptions made by behavioral psychology as a science and the application of behavioral psychology in behavior modification are examined. It is concluded that behavioral psychology and Christianity are complementary rather than conflicting when viewed in the proper perspective.*

Behavioral psychology, which is the modern counterpart of Watson's behaviorism, is described by such terms as objective, experimental, scientific, laboratory, and operational. The impact of behaviorism on modern American psychology has been great; in fact most introductory psychology textbooks define psychology as the science of behavior. Behavioral psychology is viewed by many, both within psychology and within the church, as being incompatible with Christianity because of its philosophical assumptions, and competitive with Christianity in applying its knowledge in behavior modification.

There are many approaches to the study of man, such as through religion, literature, history, sociology, anthropology, biology, chemistry, and physics, as well as psychology; and each, by itself, represents an incomplete study of man. Some have proposed a redefinition of psychology so that it will not be bound only to the investigation of behavior using only the scientific method. The general position taken here is that it is not necessary to redefine these approaches to the study of man (which complement each other); and if we attempt to redefine each of them to be a complete study of man in itself, the potential contributions to the understanding of man made by each of them will be lessened. Each approach, in emphasizing one aspect of man, has the greatest potential for making contributions in that particular area, although there is always the danger that people working in a given area will overemphasize its relative importance. Specifically, the thesis of this paper is that Christianity and behavioral psychology are not conflicting, but rather that they are complementary, and that the reason they are so often seen as being in conflict is that there is a misunderstanding of the basic assumptions and aims of behavioral psychology. This misunderstanding is common to both those who call themselves behavioral psychologists and those who call themselves Christians.

## The Philosophical Level

Any system must begin with a set of philosophical presuppositions although these are not often stated explicitly. Kaufman (1968), however, lists the following basic assumptions: (a) The universe is uniform and permanent, (b) the world can be known, (c) the universe is determined, and (d) events do not occur without being caused. The behavioral psychologist builds his structure of laws of behavior with these assumptions as a foundation, and thus, his system of knowledge is only as correct and complete as his initial set of assumptions. That is, if any of these assumptions are incorrect or incomplete, so is the behavioral psychologist's system.

## The Universe

Since the basis of all science is observation, the term "universe" or "world" in the above set of assumptions is generally taken to mean the physical universe which can be known through the senses. Any concept which does not have some observable components is a scientifically meaningless concept because it cannot be investigated by means of the scientific method. If the scientist further assumes that there is nothing more than the material world which he can know through

his senses, this assumption is in conflict with those made by Christianity which assumes a spiritual as well as material dimension. The scientist should remember that this further assumption, although parsimonious, is not a necessary assumption for him to make in order for him to pursue knowledge through the scientific method. He should also be aware that his conflict with Christianity is between what he and the Christians *assume*, and not between Christianity and anything that he has proven by the scientific method.

Since the Christian assumes a spiritual dimension to life, as well as a physical dimension, he may view the causes of behavior as represented in Figure 1. Some causes of behavior have already been discovered, such as various "laws" of learning, the behavioral effects of some drugs, and the effect of certain types of damage to the nervous system.

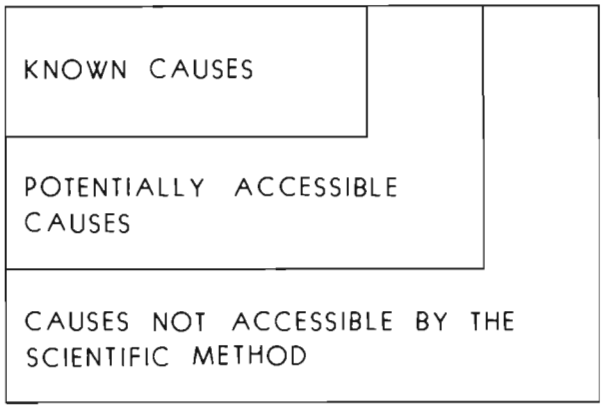


Figure 1. Schematic diagram of causes of behavior. See text for explanation.

The potentially accessible causes of behavior include those which are in principle discoverable by the scientific method; that is, they have some publicly observable or potentially publicly observable components. Since all science starts with the observations of the scientist and these causes have observable components, it is a matter of time and experimentation until they are discovered to have an effect on behavior. For example, these might include such things as certain types of radiation influencing behavior or some as yet unknown childhood experience determining adult behavior.

There may also be causes of behavior which are in principle not accessible to the scientific method and these would include such things as spiritual forces. Since we are unable to manipulate these spiritual forces at will, we cannot conduct carefully controlled experiments with spiritual forces as independent variables to see what their effect on behavior is. Since spiritual forces do not have observable components, they cannot be investigated directly; however, one may be able to investigate some of these indirectly, such as through changes that take place in an individual's personality profile following certain spiritual experiences if an adequate operational definition of the spiritual experiences can be made.

Thus, the task for behavioral psychology as a science lies in increasing the number of known causes of behavior by conducting experiments involving the potentially accessible causes. In a Christian perspective, behavioral psychology is, of necessity, an incomplete study since some causes of behavior are beyond study by means of the scientific method.

*Christianity and behavioral psychology are not conflicting, but rather are complementary.*

### Determinism

The assumption of determinism, although an ancient problem, is one currently generating much interest. It generates much uneasiness when applied to human behavior because it implies that men behave like robots, having no spontaneity, creativity, or choice. Skinner (1948) in his utopian novel, *Walden Two,* makes this one of the basic assumptions of the book, and he has now written a whole book, *Beyond Freedom and Dignity,* (Skinner, 1971) dealing explicitly with these assumptions. He has stated that he regards himself simply as an organism responding to its environment. His behavior bears this out; he has a clock on his office wall which starts whenever he turns on his desk lamp, and whenever it has run twelve hours, he plots a point on his cumulative response curve (Evans, 1968). He can then look at his cumulative response curve of number of pages written during each twelve hour period and see what his rate of responding has been over any period of time, thus determining whether or not his environment has been efficient in producing his verbal behavior.

Since the concept of freedom is at the very center of the democratic form of government, if scientific behavioral control is a threat to the concepts of free choice and free will, then the behavioral scientists should discuss the implications of their work as Andrews and Karlins (1971) point out. Does an election simply mean that the person elected had the most effective means of behavioral control at the time of the election? Can the imprisonment of criminals be called justice? Even though the determinist might concede that punishment might be used to change behavior, although it is quite inefficient if used alone, it certainly could not be called justice. Since the individual's behavior is completely determined, he is not responsible for his actions and should not be punished for them. If human freedom is a myth, we cannot even talk about responsibility or justice on the human level and certainly not on the divine level (Hammes, 1971). The concept of "divine justice" becomes one of God dispensing eternal punishment to someone for something for which he was not responsible.

Sanford and Wrightsman (1970) emphasize that the behavioral scientist must be aware that he has adopted determinism only as a working strategy, regardless of his own personal philosophical convictions. The behavioral scientist acts as if man's world and his behavior were completely determined and as if he is capable of discovering these natural laws so that everything, including human behavior, is completely predictable. He must realize that there is no way he can know on the basis of scientific evidence whether man is free or determined, so he adopts as a working strategy, but not as a final truth, the principle of determinism. As long as the behavioral scientist maintains this position, he is not in conflict with Christianty; the conflict begins when he stops viewing this assump-

*The scientist should be aware that his conflict with Christianity is between what he and the Christian* assume, *and not between Christianity and anything that he has proven by the scientific method.*

tion as a working assumption and starts believing it as a final truth.

If all of the above assumptions are viewed as a philosophy of life or some statement of absolute truth, there would be some conflict between Christianity and modern behavioral psychology. Some behavioral psychologists take the above assumptions quite seriously; however, Marx and Hillix (1963) conclude that the metaphysical behaviorism of J. B. Watson has all but disappeared, while the behavioristic methodology has remained as behaviorism's lasting contribution. The assumptions above must be viewed as the scientist's "articles of faith," not implying any mysterious system of beliefs, but simply as unproven, initial assumptions taken at face value which are necessary in the pursuit of factual knowledge. These necessary scientific assumptions must be recognized as only working assumptions with the resulting body of knowledge only as correct and complete as the initial set of assumptions on which it is based.

**The Applied Level**

While behavioral psychology is involved as a science in discovering more and more causes of behavior, it is being increasingly applied in behavior modification. The many types of behavior therapies which have grown so much in popularity in the last few years are direct applications of behavioral principles discovered in the psychological laboratory. The Christian often views these with some suspicion because they are seen as modifying the individual's behavior without doing anything about the underlying spiritual problem, so that the individual no longer feels a need to do anything about the spiritual problem.

Although man is a whole, those interested in helping him have specialized in treating one aspect of him, just as the various disciplines have specialized in studying one aspect of him. In its application, behavioral psychology must work with at least Christianity and medicine to attempt to treat the whole person. The primary task of Christianity is to treat spiritual problems, the primary task of medicine is to treat physical problems, and the primary task of psychology is to treat behavioral problems. Any treatment to be complete should include treatment in all areas because, although a problem may arise in only one area, as time goes on it is likely to involve other areas. If only one area is treated, the probability of a lasting cure is decreased because the problem in the other areas tends to recreate the original problem or one related to it.

For instance, if a person makes inappropriate internal responses to conflict or stress, an ulcer may develop. If a medical doctor treats only the ulcer, it is likely to heal, but unless the person learns to handle conflict or is removed from the stressful situation, the ulcer is likely to soon recur. On the other hand, physical problems may lead to behavioral problems as in the organic psychoses or the taking of psychoactive drugs which alter states of consciousness and can bring about abnormal behavior. Of course, it is well known that physical problems often lead to spiritual ones, so whenever a member of a congregation becomes ill, the minister calls on him, realizing that in time the person with a physical problem is likely to have a spiritual one as well.

Behavioral problems may lead to spiritual problems, as in the instance of the individual who has a phobia which *may* simply be a conditioned fear response. When he receives spiritual help without extinguishing the conditioned fear response and finds that he still has the phobia, he begins to feel guilty because he believes that as a Christian he should not be afraid. Thus, he begins to doubt the power of Christianity when his problem is not a spiritual one at all, but a behavioral one of making the wrong conditioned response. Spiritual problems, on the other hand, may lead to behavioral problems, as is well known in the case of guilt being found in the etiology of so many neurotic and functional psychotic reactions. This fact may also help to account for some of the difficulties in the treatment of the mentally ill. It is a well documented fact that most psychologists and psychiatrists have difficulty in bringing about lasting cure rates above the spontaneous remission rate, and in the framework of this paper one would say that it is because they attempt to treat the behavioral problems but ignore the spiritual ones.

Some Christians believe that a spiritual experience should automatically solve all behavioral problems, but this is not the case. Since a spiritual experience is not expected to correct all physical problems, such as diabetes or broken bones, there is no reason to expect that all learned inappropriate responses will suddenly be changed. Sometimes physical healing does take place with spiritual healing, but this is the exception rather than the rule, and the same is true of the solution of behavioral problems. A person given only spiritual help, and no help in breaking old habits or solving the other behavioral problems he has, is likely to soon be in need of spiritual help again.

The specific task of the behavioral psychologist then is to treat the behavioral problems although, of course, the adequately trained Christian behavioral psychologist is likely to deal with spiritual problems as well. The Christian psychiatrist with his training in medicine, specializing in the treatment of the mentally ill, may deal with all three areas himself. The behavioral psychologist may use any means available to treat the behavioral problems, although since he is putting the emphasis on changing behavior, he is more likely to use the behavior therapies than those therapies which rely more on catharsis.

*The primary task of Christianity is to treat spiritual problems, the primary task of medicine is to treat physical problems, and the primary task of psychology is to treat behavioral problems. Any treatment to be complete should include all areas.*

## Conclusion

Behavioral psychology does not conflict with Christianity at the philosophical level as long as it is kept in mind that its assumptions are a set of working assumptions necessary for the pursuit of knowledge by the scientific method. Also, in the applied area it complements Christianity in that it enables the whole person to be treated more adequately by receiving behavioral help along with spiritual help.

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# The Concept of the Soul in Psychology and Religion

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*The study commences by querying the validity for either psychology or religion of the concept of the soul. Traditional religious concepts have always given a prominent place to man's soul as a distinct entity. It is argued that this idea derives from Platonic philosophy and historical evidence is adduced to support this contention.*

*The Christian religious viewpoint must be founded upon the biblical data and these do not provide any grounds for the traditional 'dipartite' or 'tripartite' views of man. On the contrary, it is argued, the Bible sees man as a unity, a single personality. Similarly modern psychology begins with the 'person.' Modern views of the personality are discussed and it is maintained that the overwhelming consensus sees personality as dependent upon bodily integrity, particularly that of the central nervous system.*

*It is argued that for both religion and psychology the only valid view of man is as a unified and integrated personality. The practical implications of this are very briefly discussed.*

The late C.E.M. Joad was renowned for his insistence upon the need for adequate definition, and it is a commonplace of human experience that much of the misunderstanding that may arise between one person and another does so as a result of imprecision in language and a lack of mutually accepted definitions of terms. It might, therefore, with reason, be argued that a discussion of the concept of the soul in psychology and religion should begin with a definition of what we are to understand by 'soul'. Such a course of action, however, would be to 'put the cart before the horse'. It is a manifest impossibility to arrive at a meaningful definition without possessing all the relevant data. Furthermore, we must ask ourselves whether the concept of 'the soul' as a distinct entity possesses either validity or meaning. In order to reach a decision it is essential for us to examine the psychological and religious views of man's constitution. It should be added at this juncture that, for the purposes of the present study, the term 'religion' will be taken to mean 'the Christian religion'.

From the biological standpoint there is nothing by which we can *quantitatively* distinguish man from the other animals. While there may be differences in de-

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gree, there is no absolute difference in biological terms between man, and say, the higher apes. On the other hand the Judaeo-Christian tradition affirms that man stands as distinct from the rest of the animal creation. The biblical record states that man was created in 'the image of God'. Does this then imply that man has some sort of spiritual 'extra' — a 'soul'? The traditional religious viewpoint would almost certainly reply in the affirmative. It is, however, our conviction that this viewpoint is defective and misleading, and it will be part of the purpose of this study to argue that the concept of a 'soul' cannot be considered as meaningful for either psychology or religion and should thus be discarded. Before any misunderstanding can arise, let it be stated clearly that we affirm man's distinction from the rest of the animal world. Man alone, as far as we can tell, is capable of making value-judgments and man alone is the one that the biblical record presents as being able to co-operate as a willing agent in the purposes of God. Further, it was through a Man that God chose to redeem His creation.

Before proceeding further with our argument, however, it is essential that we look briefly at the traditional religious concept of the soul.

### Traditional Statements concerning the Soul

It is surely axiomatic that the Bible is to be considered as the foundation for the Christian faith. The Christian viewpoint and the formulations of Christian doctrine should owe their origin to the biblical data, irrespective of the precise terminology we may use in our statements. The question we must face at the outset is whether the traditional statements of the doctrine of man are derived from the biblical data or whether they owe their conception to categories of thought which are essentially unbiblical. It is our conviction that the latter is the case.

In seeking to establish this contention we shall begin with a reference to Plato's *Phaedo*. This is an imaginary report of a discussion Socrates is supposed to have held in his condemned cell. In the course of the discussion we have propounded the essence of the Greek view of the soul. It is conceived as being immortal, immaterial and like the divine.[1] O. Cullmann summarises the viewpoint as he writes, the 'body is only an outer garment which, as long as we live, prevents our soul from moving freely and from living in conformity to its proper eternal essence . . . (Death) looses the chains, since it leads the soul out of the prison of the body'.[2] This conception was to be developed later by the Neoplatonists, especially Plotinus and Proclus, into a more cohesive form. Almost inevitably, Christian thought was greatly influenced by this viewpoint as it moved further from its Palestinian roots into the Hellenistic world.[3]

The systematic formulation of these ideas into Christian doctrine came with Augustine of Hippo. His view of the soul was thoroughly Platonic. It was an immaterial and indestructible substance which ruled the body. It was to be considered the mirror of the divine nature corresponding in its faculties to the Trinity itself.[4] Augustine's writings were to exert a profound influence upon the development of Christian thought down to, and beyond Thomas Aquinas and the development of mediaeval Aristotelianism. Aquinas himself, although renowned for introducing a system which harmonized Christian thinking with Aristotle, was nonetheless also influenced by Neoplatonic concepts. His view of the soul differed from that of Augustine in many respects, especially in considering the soul as united with matter to produce the 'form' of the body, yet he still thinks of it as occupying an intermediate position between purely material and purely spiritual. Man's understanding is the demonstration of the soul in his system and is evidence of its spiritual nature and its immortality.[5]

*The concept of a "soul" cannot be considered as meaningful for either psychology or religion and should thus be discarded.*

Not suprisingly the Reformation theologians, in view of their cultural and intellectual background, did not move from these basic presuppositions in regard to the soul. They formulated their 'doctrine of man' in the traditional categories of a christianized Greek philosophy. Calvin, for example, speaks of the soul as 'an immortal, yet created essence . . . an incorporeal substance'.[6] Calvin represents a return to Augustinian thought rather than the Aristotelian concepts of the schoolmen, but the basic categories remain the same.[7] In each case, in fact, it is apparent that the understanding of the soul of man was based upon metaphysical speculation rather than observed or recorded data. While certain shifts of emphasis occurred through the years the governing presuppositions remained unaltered.

What is surprising is to find that these viewpoints are still held by a large number of modern theologians. Two writers will illustrate this point. L. Berkhof develops a theory of 'realistic dualism' to explain the relation between soul and body and writes, 'body and soul are distinct substances, which do interact, though their mode of interaction escapes human scrutiny and remains a mystery to us . . . from the continued conscious existence and activity of the soul after death it appears that it can also work without the body'.[8] It is important to note the assumptions that are made here. In the first place the 'soul' is a distinct *substance,* capable of being separated from the body and of surviving death. This is but a restatement of Platonism. Furthermore, he refuses to admit that the nature of the 'soul' and its relationship to the body are matters for investigation.

The second example is a writer well known in evangelical circles of Christian thought. Erich Sauer considers man to be 'a trinity in unity, and his invisible inner being consists of two substances to be clearly distinguished'. These two substances are 'soul' and 'spirit' and he goes on, 'the soul is the connecting link . . . a "body" for the spirit, even as it is itself enclosed by the body as its own material frame'.[9] Once again we are confronted by the Platonic conception of 'soul' as a distinct substance, but Sauer adds the further thought that the body is the 'frame' for the soul. This is little removed from the idea of the body as a prison from which the soul is released at death. Space precludes mention of other modern writers who adopt the position we have outlined and which may be considered as the traditional conception of the soul.[10]

It is true that many theologians today have abandoned these traditional formulations and categories of thought, recognising the unbiblical origin; they are, nonetheless, deeply rooted in religious thought. Furthermore, it is this metaphysical approach which is generally viewed as the Christian understanding of man. It is an essentially speculative concept, and, while it may be considered *a* religious view of man, we contend that it is not *the Christian* view of man. It is this traditional concept which is, rightly we judge, viewed as highly suspect by physiological psychologists and is one of the factors leading them to voice their strong criticisms of 'religion' for indulging in metaphysical speculation which bears no relation to observed realities.

In this discussion we purpose to demonstrate that the biblical understanding of the soul is far from these ideas derived from Greek philosophy. Further, we also hope to show that the view derived from the biblical data is in essential agreement with the findings of modern physiological psychology. The Bible is concerned with the wholeness of man and its basic concepts and assumptions are those of Hebrew thought which stands in marked contrast to that of the Greeks.[11]

### The Biblical Concept of the Soul

If the traditional formulations concerning the nature of the soul are judged inadequate and misleading from the standpoint of the Christian religion, it is imperative that an alternative view be propounded. Such a view, as we have already indicated, must be derived from the biblical data. We shall therefore commence our study of the biblical concept of the soul by investigating the data provided respectively by the Old and New Testaments. In a study of this nature it will be impossible to do more than indicate the essentials of our argument and it will not be possible to give any treatment of the possible objections to our thesis. Before proceeding further we should note two features of biblical syntax. The first is the use of *synecdoche,* a figure of speech in which the part stands for the whole. Secondly, we should also be aware of the use of *poetic parallelism,* in which two or more phrases standing side by side utilise different words to express the same meaning. These usages will become apparent as the study progresses.

*The view derived from the biblical data is in essential agreement with the findings of modern physiological psychology.*

Two words are of especial relevance to our study in the Old Testament. These are *nepes* and *rûah,* usually translated by 'soul' and 'spirit' respectively in the AV. *Nepes* is etymologically related to the Akkadian *napistu* meaning 'throat', 'gullet', or 'neck'.[12] It is used in this physical sense in a number of places in the Old Testament. At Psa. cv. 18, for example, we have, 'His feet were hurt with fetters; his neck (*nepes*) was laid in iron'. Again, at Psa lix. 1f. we read, 'Save me, O God, for the waters have come up to my neck (*nepes*); I sink in the deep mire, where there is no standing, I am come into deep waters, where the floods overflow me'. A further usage which is again essentially physical is seen in the relationship expressed between *nepes* and blood, as at Gen. ix. 4; Lev. xvii. 11; Deut. xii. 33, etc. In this respect the suggestion has been made that this is the way we are to understand *nepes* at Gen. xxxv. 18—'as her *nepes* was departing . . . she (Rachel) called his name Benoni'. Death from post-partum haemorrhage was tragically common before the days of blood transfusion.

At this juncture we should take note of the fact that an essential feature of Hebrew thought is the idea of movement.[13] The Hebrew conceived his world in dynamic terms and this was naturally applied to the concept of living beings. The basic distinction between the living animal and the dead one was that the living were active, involved in constant movement. The man who was alive showed this by doing things, he worked, when necessary he fought, he ate and drank, he fathered children and so forth. This essential feature of all living things was captured by an extension of the use of *nepes.* It came to represent the vitality of the individual and in this sense was used of anything that was alive. Thus the animals share this characteristic with man and can be called 'living souls' (Gen. i. 20,24; ii. 7, 9; Lev. xi. 10, etc.).

A. R. Johnson[14] has conveniently summarized this usage under four headings. The word may speak of the principle of life as at I Kings iii. 11; Gen. xxxvii. 21. It may refer to the physical vitality of an indivdual as at Num. xi. 6; Lam. ii. 12, etc. Then again it may be used to express affect, a man's emotional vitality as at Psa. xlii. 6; Job. iii. 16. Finally, it may speak of the volitional vitality of the individual, expressive of will and purpose. as at Gen. xxiii. 8; Num. xxi, 5; Deut. xxi. 14; II Kings ix. 15. The intrusion of death into individual existence brings about a cessation of all activity, whether physical, emotional or volitional. The coming of death thus means the loss of vitality, the loss of *nepes.* Accordingly, we find such expressions as 'all the days that he separates himself to the Lord he shall come at no dead body (*nepes*)' (Num. vi. 6, see also vi, 11; Lev. xxi. 1; Hag. ii. 13). A dead man is a dead *nepes.*

When the biblical creation narrative states that, 'the Lord God breathed into his nostrils the breath (*rûah*) of life; and man became a living soul (*nepes*)' (Gen. ii. 7,) we may conclude from what we have seen of Old Testament usage that there is no thought here of some metaphysical essence. Writes G. A. F. Knight, 'the result of God's action was not a soul within a body, one that could later be extracted from that body and which would then continue to exist apart from that body, when the body finally crumbled into dust. Man is not an amalgam of two separate entities, dust and the breath of life. He is one entity'[15]. The *nepes* thus becomes the totality of conscious being, or, as we may put it, the personality expressed in the wholeness of vitality at every level of existence. It is for this reason that we find *nepes* standing in place of the personal pronoun, a fact that will be seen from an examination of the references already provided. In the Old Testament 'soul' is 'not meant as a *tertium quid* between spirit and body, but denotes the totality.'[16] Man's 'soul' is the man himself.

Two other words require brief mention in order to complete our picture of the Old Testament view of man's personality. Closely related to *nepes* is the word *rûah,* a word which contains the basic idea of air

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in motion. In a high proportion of cases the word is used in this original sense of wind—'He commands and raises the stormy winds' (Psa. cvii. 25). The word, however, became related to man's being and was used of the power and vitality of human life. The creation of man, as we have already noted, commenced with the 'breath (*rûah*) of life' being breathed into him. Air, by virtue of its oxygen content, is essential for the life of all but the more primitive forms of animals and plants. Throughout his life man is dependent upon the air he breathes, but the movement of air in terms of wind and tempest suggests power and energy. Thus, by metonymy, that which man requires for the continuance of his vitality, becomes the vitality of being itself.

Any unusual manifestations of power or energy could be described as having or showing more 'spirit'. This was often used in relation to God-given vitality for some special purpose (e.g. Gen.xli. 38, 39, Judges xv. 14, etc.). What is important to note is that in every instance to be filled with 'spirit' implied action. Indeed, one could go so far as to say that to be filled with 'spirit' and not engaged in some activity, not performing some action, is a contradiction in terms.[17] It is also important that we do not personalize this manifestation of God-given vitality—the concept of the Holy Spirit as a mode of God's being related to the life of the Church belongs to the post-Easter theology of the New Testament.

In much of Old Testament usage there is little to distinguish *rûah* from *nepes* (note Isa. xlii. 5, etc.). The word is used to mean 'self' or simply life. Furthermore, the whole animal creation shares with man this 'vital breath' (e.g., Gen. vi. 17). Commonly *rûah* is used to express the vitality of the mind as expressive of the whole personality (Psa. xxxii. 2, lxxviii. 8, etc.) and it may also be used to describe a man's inclinations and desires (e.g., II Chron. xxi. 6; Num. v. 14; Hos. iv. 12, etc.). In none of these usages, however, is it possible to make any absolute distinction between *nepes* and *rûah*. Both words denote the life within a man and the individual himself in the expressions of his total personality.

A number of physical expressions are also used to denote the totality of man reflected in a particular action, activity or emotion. The word 'flesh' is to be noted particularly, especially the fact that it is never used as something over against *nepes* or *rûah*. The flesh is simply the outward form or expression of the *nepes*. It is the living form of the personality, or, as Eichrodt has put it, 'the necessary expression of our own individual existence, in which the meaning of our life must find expression'.[18] As H. Wheeler Robinson has pointed out,[19] however, it is often used to emphasize the fact that, in comparison to God, man is frail, dependent and incapable. Other words such as 'heart', 'hand', 'foot', 'mouth', and so on are also used, by the use of synecdoche, to speak of the whole personality (e.g., Job xxiii. 11, etc.).

It is the concept of man that is taken over into the New Testament. While of necessity the vocabulary was Greek rather than Hebrew, the underlying ideas that governed the use of the words was Hebrew rather than Greek. In the writings of Paul, for example, we look in vain for any evidence of Hellenistic dualism. Indeed, as N. P. Williams has pointed out, to ascribe such ideas to Paul is a psychological, ethical and spiritual impossibility.[20] 'No sustained argument is necessary to justify the assumption that ideas found in the Old Testament are fundamental to the understanding of much of St. Paul's teaching'.[21]

As in the Old Testament we are faced in the New with an holistic view of man. The New Testament was written out of a conviction that the coming of Christ had brought about a remarkable and radical transformation of human existence, but this change did not alter man's contitution. Rather, the coming of Christ restores man to the wholeness of being which he had lost as a result of his divorce from God. The action of God in Christ brings to man, for the first time since the Fall, the possibility of realizing his full potential. In one sense the power of the divine life adds a new dimension to man's being, but in another it brings about that inner harmony of being which allows the total development of personality in relation to God'.[22]

The key word in the New Testament is *psychē* which is generally translated as 'soul'. In some senses it stands as equivalent to the Hebrew *nepes*. It may simply mean a person's life as at Phil. ii. 30, where Epaphroditus is said to have risked his life (*psychē*) on Paul's behalf (note also Matt. ii. 20; Mark iii. 4; Acts xv. 2v 26, xx. 10 etc.). Again the word may be used to describe man's volitional activity, his vitality of purpose, as at Acts ii. 32, xiv. 12; Phil. i. 27; Heb. xii. 3, etc. In these instances the use of *psychē* can hardly be distinguished from the other Greek words used in the New Testament to express purpose and will. Similarly we find *psychē* used to denote emotional activity (e.g. Mark xiv. 34,) and there is one example of particular interest involving both volitional and emotional ideas. At Mark xii. 30 (=Matt. xxii. 37) our Lord outlines man's proper response to God. By the relationships of the words in this verse it is clear that *psychē* in this context refers to the totality of man's being and not to some part of it.

At other times the word is used in place of the personal pronouns when greater emphasis is desired (e.g., Luke i. 46, xii. 19; Acts ii. 41, vii. 14; Rom. xiii. 1, etc.). In many instances, however, man's vitality is expressed by another word, *pneuma*, usually translated 'spirit'. Indeed, this seems to be the more common word in the New Testament and it is not beyond the bounds of possibility that this may have been to avoid the metaphysical overtones of *psychē*. In certain contexts the two words are used with identical meaning (e.g., Luke i. 47). Moreover, *pneuma* may speak of the mind (Acts xix. 21; II Cor. ii. 13), and may be expressive of purpose (Phil. i. 27, where, once again, it is equated with *psychē*). In conjuntion with *soma* (body) it denotes the totality of human personality (I Cor. v. 3-5, vii. 34).

Both the words we have discussed are many-sided and in each case it is the context that gives the clue to the meaning. In this respect it is essential to distinguish

when *pneuma* is used of the human personality in its various expressions and when of the Spirit of God which we may view as the transforming life and power of God at work in the human situation and adding, as it were, a totally new dimension to human experience. As such it stands in complete contrast to everything that characterizes this age of sin and death; it is the principle of the life of the age to come. In this sense *pneuma* may stand in contrast to *psychē*. Paul's words make this clear, 'the first man Adam was made a living soul (*psychē*); the last Adam a lifegiving spirit (*pneuma*)' (I Cor. xv. 45). By his incorporation into Christ the personality of man takes on an added dimension, that of the incorruptible life of God. This, however, is a somewhat specialized use of the concept. In normal usage it is impossible to distinguish between *psychē* and *pneuma* as representative of man's personality.

Thus, in both Old and New Testaments we are presented with an holistic concept of man. In terms of biblical psychology, man does not have a 'soul', he is one. He is a living and vital whole. It is possible to distinguish between his activities, but we cannot distinguish between the parts, for they have no independent existence. 'Man is an entity, quite indivisible into his various elements, even though aspects of his personality, such as his appetites, his affections, his moral purposes, may be examined and handled one by one, just as we can look at each side of a coin in turn'.[23] From the biblicial point of view the concept of 'the soul' is meaningless and has no validity. The consequences of this approach will occupy us at a later stage of the discussion. We must now turn to consider the psychological concept of the soul.

### The Psychological Approach to Personality

In our consideration of the religious concept of the soul it was emphasised that from the standpoint of Christianity our understanding must be based on the biblical data. In this respect we need to remember that the biblical data must be elucidated and the conclusions drawn with the same dispassionate care that would be taken over the analysis of data from any laboratory experiment. In the same way, such care is also demanded from the psychologist in the assessment of his data. Some, especially the representatives of the psychoanalytic schools, have been as prone to speculation as the theologians they so readily criticize. The genuine scientist must, as far as possible, maintain an objective and disciplined outlook, even when the results he obtains and the conclusions he is forced to draw from them appear to be in conflict with previously held theories. For this reason we intend to concentrate upon the views of those psychologists who are most consciously endeavouring to follow the scientific method and base their conclusions upon the empirical data of experiment.

Little attention will be paid to the psychoanalytic schools of Freud and Jung and their followers. Those who follow this approach have allowed a free rein to their speculations, indeed, at times their imaginations! H. J. Eysenck remarked some years ago that psychoanalysis 'is essentially non-scientific and is to be judged in terms of faith and belief, rather than in terms of proof and verification'.[24] Our assessment is not intended as a value judgment; on the other hand it is essential for us to be aware of the subjectivity and intuition upon which psychoanalysis is based. Deliberately and consciously the psychoanalysts have not based their work upon scientific methodology, and whatever value their approach may have, a matter in dispute, it is not to be considered a scientific discipline. Thus it will be given no place in the present discussion.

*The integrity of the personality is to be considered dependent upon the proper functioning of the central nervous system at all levels.*

It must be admitted, however, that even where there has been a conscious effort to follow genuinely scientific principles much psychological theory tends to be the outcome of inductive rather than deductive thinking. In this respect we need to take into consideration the timely warning sounded by G. S. Klein and his colleagues, that 'the study of personality continues to be a many-faceted field, with diverse conceptions of its subject, and certainly not agreed upon demarcation of the phenomena that should be its proper concern as a distinctive speciality within psychology'.[25]

In spite of the divergences of approach it is apparent that most psychologists are prepared to begin with the 'person'. There is little of that old division into 'mind' and 'body' which bedevilled early psychological theory as much as the closely related concepts of 'soul' and 'body' still bedevil theological thinking. Irrespective of one's psychological outlook, it is generally agreed that a study of personality must arise out of a consideration of the whole human organism. This is the case whether we are concerned with establishing the sources of individual differences or with the integrative functions that go to produce a coherent organism. H. Helson is concerned with the relevant variables that make up individuality and he writes, 'personality is the person in the situation'.[26] In the same way those more concerned with intra-individual integration, that is to say with those processes which make for personal integration demonstrable through specific functions, again take the 'person' as their point of departure and the prime object of analysis, rather than some particular form of behavior or physiological process in isolation.[27]

Thus the psychologist in his study of personality is concerned with what G. Murphy has called 'the interdependence of a large number of qualitatively distinct attributes in some sort of coherent whole'.[28] Personality may thus be viewed as an interlocking of functions and traits, an architectural unity involving the whole person. Moreover this coherent interaction fulfills the function of maintaining identity across a wide range of environmental conditions, thus making the organism to some extent independent of its enviroment. It should be made clear, however, that in saying this we do not advocate that 'organismal' approach beloved of the psychoanalysts. We simply wish to make it clear that from the beginning the organism is a whole and that this wholeness may be considered as the total personality. The separate parts, such as cognition, memory, affect, may be viewed one by one, but the personality itself cannot be considered in isolation as a 'system' of the body.

It should be noted that this approach involves us in two basic assumptions. In the first instance we assume that man is an 'open-system'. That is to say he is capable of entering into transactions with surrounding

energy resources. Secondly it is assumed that man, in common with other living systems, will always tend to preserve his identity, both in spite of and because of these energy transactions. In other words the 'person' as a coherent whole possesses two distinct attributes. He has the ability to relate in a variety of ways to his environment and at the same time relate to himself, preserving himself as an independent unit separate from the environment. These tendencies will tend to produce tension and, partially at least, we may see their outworking in the phenomena of 'socialization' on the one hand, and 'individuation', the 'self-concept', on the other.[29]

It is thus assumed that the human organism possesses a genuine degree of self-regulation, and further, this is considered explicable, ultimately, in psychological terms. The integrative functions of the organism are to be described in terms of inborn behavioural tendencies, imprinted genetic patterns and the response patterns of the central nervous system. It might well be asked whether these somewhat mechanistic terms are adequate to describe such a complex picture as human personality. Some psychologists have preferred to see personality in terms of value concepts and describe behaviour as that which endows human action with meaning. Such concepts however, are matters of belief not verification. They may be true but they cannot be proved. G. W. Allport states the heart of the problem succinctly as he writes, the 'theoretical issue is not the truth or falsity of any particular formulation for some particular occasion. The question is rather where do the primary dynamics of human life lie? Shall we say that our patient suffers from a biochemical intolerance, or from an intolerable loss of self-respect? Both statements may be true; but to science it seems more objective, less animistic and mystical, to attack the problem at the biochemical level where cause and effect are easier to perceive'.[30] The problem with all value-orientated judgments and categories is quite simply that they are unable to provide us with any experimentally testable hypothesis.

Clearly much of our approach will be conditioned by individual preference, but in this respect it needs to be remembered that if psychology is to be considered as a science then it must be prepared to be governed by the same objectivity and discipline that mark the more exact sciences. The scientist must be governed by the results of experiment and observation; his conclusions must be based on these alone. He is concerned with the answer to the question 'how?' and not that of the ultimate 'why?' of existence. On this basis the problem of personality is to be answered in terms of psychology and biochemistry and not in the realms of metaphysical speculation. Reverting to Allport's example, biochemical intolerance can be measured and, in principle at least, corrected. On the other hand a loss of self-respect, while a genuine entity in terms of intra-and inter-personal relationships, is merely a descriptive term to describe the outward effects of the underlying physiological abnormality. The theologian or philosopher is entitled to use the categories of value-judgments, the scientist is not.

The psychologist thus has to interpret personality in terms of the physiological mechanisms of the body. Recent work in a number of fields, much of it popular knowledge, has made it apparent that the expression of personality is intimately connected with the central nervous system. The behavioural changes which the manipulations of neurosurgery can induce, the increasing knowledge of the pharmacology of such substances as the mono-amine oxidase inhibitors, lysergic acid derivatives, the amphetamines, and tryptamine derivatives, all of which are capable of producing changes in personality and behaviour, make it abundantly clear that in personality we are dealing with something which is biochemical in its origin. Further, the personality breakdowns which occur in such conditions as schizophrenia are due, fundamentally, to biochemical abnormalities and disturbances of neuro-cellular metabolism. This is seen again in other pathological conditions where the primary fault may lie in genetically determined enzyme deficiences, disjunction of the nuclear genetic material, vitamin deficiencies or toxic substances acting on the brain, but where the result is seen in personality disturbances.

*It is not a case of "mind" and "body", but rather of a unified, integrated, functioning person, the architectural unity of a single personality.*

The widening frontiers of neurophysiology have revealed the complex system organization which relates the cortical and autonomic arousal systems and the interrelationships of cortical and sub-cortical units. Not that these functions cannot be considered in isolation; each system is dependent upon the integrity of the body as a whole and the correct inter-working of all its functions. The personality may be unequivocally related to this interworking. The integrity of the personality is to be considered dependent upon the proper functioning of the central nervous system at all levels. Viewing the available evidence N. Sanford writes, 'it is only to the activities of the brain, the conserver of experience and the integrator of processes, that we may ascribe the *organization* that is the most essential feature of the personality'.[31] H. J. Eysenck is even more explicit. His conception of the personality is explicitly linked to the overall functioning of the central nervous system and its processing of information.[32] Starting at neural levels he postulates a genetically determined cortical and autonomic response to stimuli out of which the structure of the total response of the organism develops, in terms of conditioned behavior. The concept of conditioned responses is of vital importance to our understanding of the development of human behaviour and the structure of personality.[33] The practical importance will occupy us at a later stage of the discussion.

From the standpoint of scientific psychology it is possible to say that the coherent whole which we term personality is dependent upon the integrity and proper functioning of the central nervous system. This in itself cannot be considered an isolated entity for it is bound up with all parts of the organism's functioning—the body's systems do not work in isolation. Personality and bodily identity are thus inseparable. It is not a case of 'mind' and 'body', but rather of a unified, integrated, functioning person, the architectural unity of a single personality.[34] Once again we would assert that the concept of 'the soul' as something distinct within man can have no meaning. From the psychological point of view, as from

the Christian, man is a unity.

### Some Conclusions

If our argument thus far has carried any weight it will be apparent that the concept of 'soul' as some immaterial and immortal part of man should be abandoned. The data provided by psychology on the one hand and religion on the other, although approaching the problem from widely differing standpoints, both point to the inescapable conclusion that man is an indivisible entity. For this reason it may well be that we should abandon the use of the word 'soul' altogether since it will be impossible at this stage to rid it of the Platonic overtones it has carried for so long. Our study leads us to affirm that the concept of 'the soul' has no place in religion or psychology. Psychologists would be unanimous in discarding the word since it belongs to the realm of metaphysics and not to the realm of observable phenomena and scientific investegation. Equally, from the standpoint of the Christian religion, the idea of the 'soul' as a distinctive entity must be rejected as unbiblical and belonging to the speculative world of Greek philosophy. We would emphasize with O. Cullmann that 'the teaching of the great philosophers Socrates and Plato can in no way be brought into consonance with the New Testament'.[35]

In place of these fragmentary concepts we put forward the view of man as a living being, a vital organism, expressing this vitality of his existence through his personality. The personality thus becomes the expression of his being. It is the observed and observable phenomena of the total life displayed through inter-personal relationships.[36] Such a view of personality leads us to a further important concept, that personality can only be developed in terms of community, in terms of 'I-thou' relationships. From the religious point of view this will mean not only the adequate development of horizontal, inter-personal relationships, but, and primarily, the development of a correct vertical relationship between man and God. Much of our psychiatric practice is concerned with the breakdown of personality under conditions of stress. Such breakdowns interfere with the development of those normal relationships which belong to the proper outworking of personality and are essential for the maintenance of its integrity.

*The fact that man's redemption is a bodily event bears with it a corollary that any future state must be peopled by real beings and not incorporeal spirits.*

It is at this point that there is a close contact between religion and psychology. The biblical emphasis is consistently upon the wholeness of being which belongs to the fully integrated person. This wholeness is commonly expressed in the word 'peace' which to the Hebrew mind meant far more than merely the absence of strife. In Greek thought, as in modern Western, peace was viewed as a state, but in biblical thought peace denotes 'well being' in every department of life. The essential feature of the Christian gospel is that the coming of Christ has brought peace to man in its fullest aspect. The reality of this peace denotes the present fact of the new creation and the restoration of the whole man; it is God's salvation. The biblical emphasis is upon the fact that man astray from God can never know true harmony of being—'there is no peace, saith my God, to the wicked' (Isa. lvii. 21). On the other hand God's healing is extended to the humble and contrite, restoring the fullness of their being (Isa. lvii. 15-19). This God-given wholeness of personality is evidenced in the 'fruit of the Spirit' (Gal. v. 22f.), traits which every competent psychologist would recognize as belonging to genuine maturity in the development of personality.

The Christian would maintain that such wholeness and maturity belong only to the one whose life has been invaded by the power of the risen Christ. The Lord Himself said that He had come 'that they might have life, and that they might have it more abundantly' (John x. 10). This is the fulness of life that comes from a personality correctly orientated at all levels. On this view it will be seen that 'redemption must be accomplished as a bodily event'.[37] Just as the intolerable burden of guilt affects every part of life, so the reality of liberation through Christ affects the totality of the personality. Psychiatric methods by themselves do not remove the deep seated sickness of man, what D. M. Baillie has called the 'moral-failure complex'.[38] The liberation of man's total being belongs to the realm of divine action.

The fact that man's redemption is a bodily event bears with it the corollary that any future state must be peopled by real beings and not incorporeal spirits. From the psychological point of view the personality is dependent upon the full function of the total organism; it has no existence in its own right as an immaterial substance. The same holds true from the biblical point of view, but to this is added an additional fact. 'The hope of the *new corporeality* is grounded in the bodily resurrection of Jesus'[39], a fact that the New Testament makes abundantly clear (Rom. viii. 11; I Cor. xv. 20-22, etc.). Christ has conquered death and has introduced into life the new dimension of incorruptibility (II Tim. i. 10). This is already at work in the being of him who is 'in Christ' and the process will be brought to fruition at the Day of His Coming. There is not space to develop this and in particular how the personality can exist after death. The clue may well lie in Paul's expression, 'them also which sleep through (*dia*=by the agency of) Jesus' (I Thess. iv. 14). By the agency of Christ the transfer of being from one plane of existence to another is accomplished. The exact nature of this intermediate state must be a matter of speculation and thus unverifiable. Without prolonging the discussion we would suggest that in some way it involves the preservation of personality within the corporate personality of the body of Christ.[40]

Finally, we must touch upon the subject of conditioning. If our psychological viewpoint is correct, the development of conditioned responses is of prime importance in the formation of the total personality.[41] In one sense this is seen in the development of conscience. This regulatory mechanism is dependent for its origin upon the initiation of conditioned responses to certain 'value-situations' and in particular those developed in childhood. For this reason an uninformed conscience is an unreliable guide, in spite of the advice of Jiminy Cricket. The biblical writers were well aware of the value of conditioning, as one writer puts it, 'Train up a child in the way he should go; and when he is old he

will not depart from it' (Prov. xxii. 6). Total freedom of choice is an impossibility, there are too many factors impinging upon us. The anarchists' dream would lead to the destruction of genuine personality. The Christian responsibility, both from religious and psychological standpoints, is to ensure the correct conditioning of their children which will lead to the full maturity of personality in relation to Christ.

Inevitably much has been omitted from our discussion and lack of space has necessitated dogmatism without proof. Nonetheless, if our approach has been valid it will produce a more realistic awareness of the truth and the hope that underlies our credal affirmation, 'I believe . . . in the resurrection of the body and the life everlasting. Amen.'

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[2]O. Cullmann, *Immortality of the Soul or Resurrection of the Dead* (London, 1958), pp. 19 f.

[3]See further, C. Bigg, *The Christian Platonists of Alexandria* (Oxford, 1968).

[4]This is especially developed in *De qualitate animae*. A good introduction to the period is G. Leff, *Medieval Thought; St. Augustine to Ockham* (London, 1958).

[5]*Summa Theol.* I. 75. 6. For further details of Aquinas and his thought see, F. C. Copleston, *Aquinas* (London, 1955).

[6]*Institutes*, I. 15.

[7]John Marsh *The Fulness of Time* (London, 1952), is probably right in asserting that 'it would seem to be as characteristic for the reformed theologian to follow Plato as for the catholic to be Aristotelian.' p. 17.

[8]L. Berkhof, *Systematic Theology* (Grand Rapids, 1941), pp. 191 ff.

[9]E. Sauer, *The Dawn of World Redemption* (ET, London, 1953), pp. 39 ff.

[10]Other recent works which continue to propound the traditional concept of the soul include J. M. Shaw, *Christian Doctrine* (London, 1953), E. L. Mascall, *The Importance of Being Human* (London, 1958), and T. C. Hammond, *In Understanding be Men* (Rev. D. F. Wright, London, 1968). Similar views are stated in the older but still widely recognized and valued works of A. H. Strong, C. Hodge, etc.

[11]These differences have been carefully worked out by T. Boman, *Hebrew Thought compared with Greek* (ET, London, 1960).

[12]Basic lexicographical data have been derived from L. Kohler and W. Baumgartner, *Lexicon in Veteris Testamenti Libros* (Leiden, 1953), for the Old Testament and W. F. Arndt and F. W. Gingrich, *A Greek-English Lexicon of the New Testament* (Cambridge, 1957), for the New Testament.

[13]Note T. Boman, *op. cit.* pp. 205 f. 'According to Israelite conception everything is in eternal movement; God and man, nature and the world . . . the Greeks describe reality as *being*, the Hebrews as *movement*.'

[14]A. R. Johnson, *The Vitality of the Individual in the Thought of Ancient Israel* (Cardiff, 1949), pp. 9ff.

[15]G. A. F. Knight, *A Christian Theology of the Old Testament* (London, 1959), p. 34.

[16]W. Eichrodt, *The Theology of the Old Testament* (ET, London, 1967), p. 137. See also E. C. Rust, *Nature and Man in Biblical Thought* (London, 1953), pp. 101 ff. It is surprising to find a scholar of the calibre of L. Kohler, writing that, 'soul is therefore the (individualized) spirit, delimited by its connexion with a body.' *Old Testament Theology* (ET, London, 1957), p. 145.

[17]This conception is carried over into the New Testament. While here the Spirit of God is personalized and related to Christ's life within the Church there is still the implication that activity follows the 'filling of the Spirit' (cf. Acts 2:4, 4:31, 13:9 ff., etc.).

[18]W. Eichrodt, *op. cit.* p. 149.

[19]H. Wheeler Robinson, *The Christian Doctrine of Man* (Edinburgh, 1911), p. 25.

[20]N. P. Williams, *The Ideas of the Fall and of Original Sin* (London, 1927), p. 149.

[21]R. P. Shedd, *Man in Community* (London, 1958), p. 3. Note also J. Klausner, 'there is nothing in all the teaching of Paul . . . which is not grounded in the Old Testament, or the Apocryphal-Pseudepigraphical and Tannaitic literature of the time' *From Jesus to Paul* (New York, 1944), p. 482.

[22]This explains the New Testament emphasis on 'peace' as one of the primary results of the divine forgiveness, for peace denotes the wholeness and health of a man.

[23]G. A. F. Knight, *op. cit.* p. 37.

[24]H. J. Eyseneck, *The Uses and Abuses of Psychology* (London, 1953), p. 226. It is surprising how Freudian psychoanalysis seems to dominate religious thinking on psychology. For example R. L. Shinn, *Man: The New Humanism* (London, 1968), in the series 'New Directions in Theology Today', seems unaware of any other form of psychological thinking and E. White, "A Preface to Biblical Psychology", *Journal of the Transactions of the Victoria Institute* (1951), LXXXIII, pp. 51ff. utilizes exclusively these categories of thought.

[25]G. S. Klein. H. L. Barr and D. L. Welitzky, 'Personality', in *Annual Review of Psychology* (Palo Alto, 1967), 18, p. 467.

[26]H. Nelson, *Adaptation-Level Theory; An Experimental and Systematic Approach to Behavior* (New York, 1964), p. 541.

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[28]G. Murphy, quoted in G. S. Klein, *et al., op cit.* p. 469.

[29]See further C. R. Rogers, 'Towards a Science of the Person', in *Behaviorism and Phenomenology* (ed. T. W. Wann). (Chicago, 1964), pp. 109-140.

[30]G. W. Allport, 'The Fruits of Eclecticism—Bitter or Sweet?' *Acta Psychol* (1964), 23, pp. 27-44.

[31]N. Sanford, 'Personality, Its Place in Psychology', in *Psychology: The Study of a Science* (ed. S. Koch). (New York, 1963), p. 554.

[32]H. J. Eyseneck, 'The Biological Basis of Personality', in *Nature* (1963), 199, pp. 1031-34. See also his earlier work *The Structure of Human Personality* (London, 1953).

[33]See further H. J. Eyseneck, 'Conditioning and Personality,' in *Brit F. Psychol.* (1962), 53, pp. 299-305 and, 'Principles and Methods of Personality Description, Classification and Diagnosis', in *Brit. F. Psychol.* (1964), 55, pp. 284-294.

[34]A philosophical, as distinct from purely psychological, case has been convincingly made out for the inseparability of personality and bodily identity by B. A. O. Williams, 'Personal Identity and Individuation', in *Essays in Philosophical Psychology* (ed. D. A. Gustafson). (London, 1967), pp. 324-345.

[35]O. Cullmann, *op. cit.* p. 60.

[36]As a full definition this may be inadequate and we are forced to admit with W. L. Carrington, that "there is no simple and yet adequate definition" of personality (*Psychology, Religion and Human Need* (London, 1957), p. 40.

[37]W. Eichrodt, *op. cit.* p. 149. He goes on to emphasize that the conquest of death is to be envisaged 'not in the impossible form of the immortality of a spiritual portion of man, but only in a new mode of existence for him as a whole' (p. 156).

[38]D. M. Baillie, *God Was in Christ* (London, 1961), p. 164. His whole section on 'The Need for Divine Forgiveness' (pp. 160-166) is worthy of careful attention.

[39]W. Kunneth, *The Theology of the Resurrection* (ET, London, 1951), p. 287.

[40]W. Kunneth, *op. cit. pp.* 270-276, rightly emphasizes the theological importance of the 'intermediate state.' See further the discussions of O. Cullmann, *op. cit.* pp. 48-57 and E. Stauffer, *New Testament Theology* (ET, London, 1955), pp. 210-213.

[41]The dangers of conditioning are well illustrated by H. J. Eyseneck, 'The Technology of Consent', in *New Scientist* (1969, 42, 655, pp. 688-690. W. Sargant's *Battle for the Mind* (London, 1959), is probably still the best popular introduction to the subject.

# THE TORCH PASSES

*"When they had crossed, Elijah said to Elisha, 'Ask what I shall do for you, before I am taken from you.' And Elisha said, 'I pray you, let me inherit a double share of your spirit.'" II Kings* 2:9

*Once in a rare while the spirit of an entire organization is so captured by one individual, that he becomes the very incarnation of that organization. The ASA has been blessed to have such a leader in the person of H. Harold Hartzler. For 28 years a member of the ASA, he has been in positions of responsibility and leadership for the past 21 years. His own overview of 30 years of ASA history was published in the* Journal ASA 24, *23, March (1972). It is only appropriate that a few of the many of us who have known him and valued our friendship as Christian colleagues in science should take this opportunity to bear him tribute. This fall Harold passes on the responsibility of Executive Secretary of the ASA to William D. Sisterson, the ASA's first full time Executive Secretary. We look forward to our association in the future and know that Harold's experience and counsel will be a continuing source of inspiration and guidance.* R.H.B.

### A Man of Vision

For many years the person who has held the American Scientific Affiliation together has been Harold Hartzler. He has served without any reservations in every position of the Affiliation. He has handled every assignment expertly. He has attended every annual meeting. For a number of years he has served with distinction as Executive Secretary. This has meant many hours of labor in addition to his regular teaching position.

He has always had a *vision* for ASA. He has worked with everyone whether he agreed completely with them or not. Time after time he has made a plea for unity of spirit and always wished to cooperate with each member of the organization.

He and his wife have done much of the physical labor of mailing the *Journal* and the *News*. They both gave unstintingly to see that things ran smoothly.

Harold has shown a great concern for evangelism on the college campus, sponsoring meetings of various Christian organizations to acquaint the college students on his own campus with the claims of Christ. I have been impressed time after time with his unselfish desire to serve the Lord.

Much of the success of the American Scientific Affiliation in the future will be because of the vision of this man.

**Donald C. Boardman**
*President* 1971, 1972
Wheaton College
Wheaton, Illinois 60187

### An Elder Statesman

To write a tribute to Harold Hartzler in a few words is a challenging task indeed. His active involvement with the ASA goes back more than a quarter of a century to a time when some of our younger members were not even born. Over the years Harold

H. HAROLD HARTZLER

Born in 1908, Harold majored in physics and mathematics at Juniata College, Huntingdon, Pennsylvania, and received his Ph.D. in physics with a minor in mathematics from Rutgers University in 1934. He has served as Professor of Mathematics and/or Physics at five different colleges between 1935 and the present, including 16 years in three different periods at Goshen College and 13 years at Mankato State College, his present position. He is a member of scientific societies concerned with mathematics, physics or astronomy, and has served as President of the Sigma Xi Club and of the AAUP at Mankato State, as well as Secretary and President of the local Christian Business Men's Committee. He holds the unique record of having attended every one of the 27 annual meetings of the ASA. He is the author of a number of articles published in the *Journal ASA*, including a paper on "The Meaning of Mathematics" published in the very first issue of the *Journal ASA* in January 1949, and of chapters on science and Christian faith in several books. Harold is an active member of the Gideons and serves as faculty advisor to the Inter-Varsity Christian Fellowship at Mankato State College.

has been a faithful, committed, enthusiastic, and long-term supporter of our affiliation; he is an elder statesman who more than any other single person has shaped ASA history.

In working with Harold during the past several years I have found him to be dedicated, co-operative, optimistic, humorous, and sometimes a little stubborn —in that order. He has consistently shown a great love for science along with a deep respect for people; a wise and mature caution but with an open-ness to new ideas and suggestions; an ability to express and defend his opinions, but an ever-present willingness to put his own ideas aside if the Executive Council or membership voted for another course of action.

As he has worked for the ASA, Harold has been assisted by his wife who has labored in the background, helping with the many mundane tasks that most of us know nothing about. Mrs. Hartzler deserves a share of the gratitude that we feel towards her husband.

Harold has been a competent ASA leader but more important, he has been and is a committed Christian. By his words and actions he has repeatedly reminded us that we are an organization of evangelicals whose beliefs must be based on the scriptures and whose prime allegiance is to Jesus Christ. The Christian faith, the dedication, and the stabilizing influence of Harold Hartzler will continue to serve as an example to all of us who are concerned with the purposes and future of the ASA.

**Gary R. Collins**
*Executive Council* 1970-74
Trinity Evangelical Divinity School
Deerfield, Illinois 60015

### Twenty-one Years of Leadership

Dr. Hartzler's imminent retirement as Executive Secretary drives my thoughts back some twenty-eight years. In September of 1944 I received a letter from Dr. Hartzler inquiring about the ASA. He seemed obviously qualified, so in answering his letter I enclosed an application blank. In my letter I said:— "You may be interested in knowing that our membership was 43 in August of this year. These are all Christian men of science with whom I am sure you would be pleased to be associated."

He promptly filled out the blank and returned it. I forwarded it to Dr. Barnes with the comment:—"I am completely satisfied that Dr. Hartzler is a worthy applicant for membership in ASA and I recommend him wholeheartedly to the Executive Council". How prophetic those words seem in retrospect!

He joined an organization of 43 members which has grown to 1800. Much of this growth has been due to his own efforts. His contribution to ASA has been unique in his unprecedented continuity in high office. His ten years on the Executive Council (including two years as Secretary-Treasurer and six years as President) followed immediately by eleven years as Executive Secretary adds up to twenty-one years at the highest level of policy making and administration. Harold has worked long, faithfully, and so effectively for the ASA. He has truly earned the right to retire honorably from the office of Executive Secretary.

Speaking of his retirement, I just can't visualize Harold in a rocking-chair on the porch.

**Irving A. Cowperthwaite**
*One of Founding Fathers of ASA*
*Executive Council* 1941-1943
10 Willoughby Road
Milton, Massachusetts 02187

### A Faithful Servant

Harold Hartzler's long and distinguished contribution to the ASA has been characterized chiefly by enthusiasm and faithfulness. Although in short supply in the world around us, Harold has demonstrated a seemingly boundless supply of these scarce commodities. Both of these, of course, are rooted in and flow from his deep Christian convictions. There was only one way for Harold to show his approval of the ASA and its program—that was to throw himself into its work, not just on convenient occasions but to give of himself unstintingly at great personal cost and over a period of some 25 years.

I cannot envision any organization growing and thriving without a liberal endowment of the traits of enthusiasm and faithfulness among its leaders. Fortunately for us, completing his long career as Executive Secretary does not mean that Harold's vitality will be lost to the ASA. But there is need for massive infusions of enthusiasm and faithfulness at every administrative level and in every individual member of the ASA. And Harold has set before us a vivid and wonderful example for just that!

**F. Alton Everest**
*One of Founding Fathers of ASA*
*Executive Council* 1941-1950; *President*
5-A LaSalle Rd., 2/F
Kowloon, Hong Kong

### An Indelible Imprint

The character and the accomplishments of many organizations and institutions can be traced quite directly to the few individuals who have provided the leadership in the years of formation and growth toward maturity. The American Scientific Affiliation is no exception, and Harold Hartzler is one whose imprint is indelibly upon it.

Ever since I first became a part of ASA, Harold Hartzler has been in places of leadership and responsibility in it, first as an officer then as its executive secretary. For years the two—Harold Hartzler and the ASA—have been so closely inter-related that it seems difficult to think of one without the other. On a more personal level, I count it a privilege to know Harold not only as a colleague in the ASA but also as a personal friend. So I, for one, wish to express thanks to Harold Hartzler for his outstanding service in the American Scientific Affiliation and, at the same time, to express confidence that the foundations which have been laid will be built into even greater accomplishments in the years ahead.

**Robert B. Fischer**
*President,* 1966, 1967
California State College
Domingues Hills, California 90246

### A Fine Example

None of our members over the years has so merited the title "Mr. ASA" as Harold. We accept with re-

luctance his stepping down from the position of Executive Secretary, and we hope he will have many more years among us as the very interested participant in the work of ASA he has always been. If ASA is the lengthened shadow of founding fathers, then Harold has helped make both umbra and penumbra. We shall always remember his ready smile (sometimes through a handsome beard), his friendly needling, his ardent opposition to war, his strong interest in all the work of ASA but especially his concern for science education as an aid to understanding the way God works through nature, his faithful attention to the necessary details of the execution of his office, his unflagging zeal for the goals of ASA, his vision for a greater opportunity for ASA in the hearts of scientists the country over, and the fine example of his own personal faith in Jesus Christ. We do him no more than his due when we thus honor him.

**Charles Hatfield**
*President*, 1969, 1970
University of Missouri:-Rolla
Rolla, Missouri 65401

### Devoted Service

Harold Hartzler welcomed me into ASA when I was a graduate student, before we met at the 1951 annual meeting at Shelton College in New York City.

A few years later, Harold became the answer to my desperate prayer by becoming ASA's first paid officer. In 1958 I was elected to the Executive Council and eventually succeeded Hendrik Oorthuys as Secretary-Treasurer. I was on the faculty of Iowa State University by then. For at least a year after Hendrik moved from Purdue to Oregon State, his former secretary, Joan Pubols, maintained the ASA office in Lafayette. But the Affiliation grew faster than correspondence between Ames and Lafayette could keep up. I was teaching, doing research, and beginning to raise a family, plus speaking around the country for IVCF and AIBS. My evenings and weekends overflowed with ASA business. I was at the end of my spare-time volunteer rope.

Just in time to rescue me from personal crisis, Harold stepped in. He agreed to move the ASA files from Lafayette to Mankato and work part-time as Executive Secretary for something like $100 a month. If I could have afforded it, I would gladly have contributed that monthly $100. But I did begin to give a significant part of my tithe to ASA, because I saw that Harold Hartzler was leading us into new growth and accomplishment. Much of our present momentum is due to his devoted service, one of the great bargains of all time.

Thank you, Harold.

**Walter R. Hearn**
*Editor, ASA News*
*Executive Council* 1957-1961
762 Arlington Ave.
Berkeley, California 94707

### A Kind Heart Slow to Blame

It has been my pleasure to know Dr. Harold Hartzler for 18 years and to have close association with him during the time that I was an Executive Council member and the Book Review Editor for the *Journal ASA*. I was always impressed by his steadfast dedication to what he believed to be a good cause—the ASA—giving up much of his free time day after day for little or no remuneration. By so doing he has given continually to this loosely organized group. He has probably prevented many conflicts from developing between members through his kind heart and slowness to blame others. It has also been a pleasure to work with him because of his flexibility and willingness to accept new ideas.

By his jovial personality coupled with his delightful wit he has interjected a refreshing lightness into many weighty discussions and has helped people to feel at ease.

The recent addition of a beard adds a note of distinction but does not hide the twinkle in his eye. Although relieved of his heavy responsibilities, I am hoping to see Harold at many annual meetings to come and to feel his influence and hear his historical perspective.

**Marlin B. Kreider**
*Executive Council* 1970-1971
Worcester State College
Worcester, Massachusetts

### An Enthusiastic Conscience

As I recall the years during which I have known and worked with Harold Hartzler a clear picture of him comes to my mind. One thinks first of all of his enthusiasm for the ASA. It is always present, not only at conventions and Executive Council meetings but, more important, between meetings when it is so easy to become completely occupied with other matters. Harold has been the conscience of the Executive Council in keeping it effective throughout the year.

Of similar significance is the role that Harold has played as a unifying force in the ASA. Although his beliefs are probably with the more conservative members of the ASA, his view for the ASA has included all Christians in agreement with the ASA statement of faith. Harold's example in this respect has had a great influence in maintaining the broad spectrum of opinion in the ASA. This diversity among our members is our greatest strength and few organizations are successful in achieving and maintaining such a condition.

Of course, Harold has served effectively in his many duties as Executive Secretary: mailing *Journals*, collecting dues, supervising conventions, etc. However, his unique and lasting contributions to the ASA have been his enthusiasm which has kept the organization in good health and his vision of an inclusive ASA. We thank you, Harold, for your effective and faithful service through the years.

**John A. McIntyre**
*Executive Council* 1969-1973
Texas A & M University
College Station, Texas 77840

### A Christian Gentleman

To me, Harold exemplifies the Christian gentleman of science. I have been especially impressed with his ability to separate a point of view from the person

who holds it. Unfortunately many of us often fail to accomplish this, and therefore take a negative view toward people with whom we disagree on some scientific or theological issue.

Since I am a newcomer to the Executive Council, I have had less personal contact with Harold than others have. However, as a past president of a local ASA section, I always found him willing (and able) to give important advice and encouragement. We owe an incalculable dept to Harold for his contributions to the ASA and to us as individuals.

**Claude E. Stipe**
*Executive Council* 1972-1976
Marquette University
Milwaukee, Wisconsin 53233

**Mr. (ASA)$^3$**

Dedication seems to me to be the word that best describes H. Harold Hartzler and his work with the ASA. I have had the privilege of working with him as a teaching colleague and in the operation of ASA. He has always shown the virtues of a Christian combined with the thoroughness of a scholar. Beyond these attributes however has been his dedication to the task of relating Science and the Christian Faith.

Certainly no one has been a more consistent proponent of the work of the ASA nor a more faithful evangelist for members in the association.

When he taught at Goshen College his students often referred to him as $H^3$ or Cubey, based on his name. Somehow it seems that we ought to vote him a triple honor, Executive Secretary cum laude Emeritus, or perhaps Mr. $(ASA)^3$.

**Henry Weaver, Jr.**
*President* 1962
215 Carter Ave.
Goshen, Indiana 46526

# *Speed Saves Time: Scientifically Demonstrated*

# "MAN DOES NOT KNOW HIS TIME"

(*Ecclesiastes* 9:12)

Among the predictions of relativity theory that shatter our common sense concepts of the universe around us, none seems harder to grasp than the prediction that the measurement of time itself depends on the relative velocity between two clocks. Given one reference clock at rest in an inertial reference system, the theory predicts that a clock in motion with a velocity $\underline{v}$ with respect to this system will record less time than the reference clock, such that

$$\frac{t_{\text{moving}}}{t_{\text{reference}}} = [1-(\underline{v}/\underline{c})^2]^{1/2}$$

where $c$ is the velocity of light. Common sense objections (joined also by much more sophisticated technical arguments) to this apparent violation of experience attempt to make the moving clock "appear" slower without really being slower. There are many kinds of clocks however, and one kind is simply the biological clock of a human being; the prediction then is that the moving human being *ages* more slowly than the reference human being at rest. A twin moving in space flight while his twin brother remains on earth should then age more slowly than the twin on earth, and this age difference should be obvious when the moving twin returns to earth. Disagreements about this interpretation have given origin to the debate about the so-called "twin paradox."

The ideal way to solve theoretical dilemmas is to perform a suitable experiment, i.e., permit the universe to give its own answer. But physically realizable speeds are so much less than the velocity of light that the predicted rate differences are impossible to measure by most known means. The velocity of an airliner going 600 miles per hour, for example, corresponds to a speed of 1/6 of a mile per second compared to the speed of light of 186,000 miles per second, i.e., the velocity of light is over a million times larger than the velocity of a jet airplane. Experimentally the solution of the problem requires either faster speeds (by many orders of magnitude) or much more sensitive methods of measuring time. The former is not presently practical; the latter has in recent years become possible.

It is clear that standard clocks or biological clocks are not going to be anywhere near exact enough for the demands of the above experiment. In recent years, however, a standard of time has been developed in terms of the specific frequency of a well-defined electronic transition in the $^{133}Cs$ atom, which in the ideal case has exactly 9,192,631,770 periods in one second. By using this transition as the standard it has become possible to construct "cesium beam atomic clocks" with an ideal accuracy of almost 1 part in $10^{10}$, i.e., 1 part in 10 thousand million. Relativistically predicted differences in the rates of these clocks are large enough to be measurable and to check the prediction.

Two brief papers in *Science* 177, 166-170, July 14, 1972 report experimental verification of the prediction of relativity theory that a clock in motion with respect to a reference clock runs slower than that reference clock through a "round trip." The authors are J. C. Hafele of the Department of Physics, Washington University, St. Louis, Missouri, and Richard E. Keating of the Time Service Division of the U.S. Naval Observatory, Washington, D.C. Their apparent decisive demonstration of the validity of this much debated aspect of relativity theory, and the reminder of their work to us that time itself is part of the warp and woof of our created universe, prompts this summary.

The experiment was carried out as follows. During October 1971, four (to eliminate random variations) cesium beam atomic clocks were flown on regularly scheduled commercial jet flights around the world twice, once eastward and once westward. The eastward trip involved 41.2 hr of flight, and the westward trip 48.6 hr of flight. At the end of their flights around the world, the moving clocks were compared with reference clocks at the U.S. Naval Observatory, and predicted results of rate loss or gain compared to that actually measured. The theory, for reason noted below, predicted that the clocks would lose 40±23 nanoseconds during the eastward trip, and would gain 275±21 nanoseconds during the westward trip (a nanosecond is $10^{-9}$ second, i.e., one thousandth of a millionth of a second). The mean measured values were a loss of 59±10 nanoseconds for the eastward trip, and a gain of 273±7 nanoseconds for the westward trip, in apparent striking confirmation of the predicted results.

In carrying out the experimental measurements described above, several additional factors had to be taken into account, (1) The reference clock in this case is on the surface of the earth, and hence not at rest. However its rate relative to a non-rotating frame of reference can be calculated in terms of the rate of rotation of the earth. Similarly the rate of the flying clock can be expressed with respect to this non-rotating reference system, and the time difference between the flying clock and the clock on the earth's surface can be calculated. (2) A rate difference for the flying clock exists independently of its motion, simply because of its height, and hence different gravitational potential from the reference clock. This rate difference is positive and represents a time gain for the moving clock. (3) When the flying clock travels eastward, its velocity is in the same direction as the rotational velocity of the earth, and a large time loss is predicted, which is counterbalanced by the time gain due to the gravitational term, producing finally a small time loss (i.e., the predicted 40±23 nanosec.) When the flying clock travels westward, its velocity is counter to that of the rotational velocity of the earth, and a time gain is predicted, which is accentuated by the time gain due to the gravitational term, producing the larger time gain (i.e., the predicted 275±21 nanosec.). (4) The jet plane does not of course travel around the earth at constant velocity; the total trip must therefore be broken down into short constant-velocity segments and the actual numbers calculated piecemeal rather than in one single calculation.

The authors close with a statement that is dear to an experimental scientist's heart.

> There seems to be little basis for further arguments about whether clocks will indicate the same time after a round trip, for we find that they do not.

How important is the effect? Philosophically it is mind stretching. Practically it is small indeed. If a man started flying eastward on a jetplane travelling its standard speed as in this experiment, while his twin brother flew westward for the same time, after one year of flight, their ages would differ by only 57 millionths of a second. Even after a hundred years of such flight, their ages would differ by only 6 thousandths of a second. The reason for the very small effect is, of course, the small velocity of the jetliner with respect to the velocity of light, and the dependence of the effect on the square of the ratio $(v/c)^2$. If the flight speed were much larger, then of course the result would be quite different. If, for example, the flight speed were increased up to 10% of the velocity of light (i.e., one circumnavigation of the earth every 1.3 sec!), a time loss would be experienced for either direction of flight, but still with a sufficiently small magnitude that it would take a flight of over 6 months to produce a 1 day difference in age between a flying twin and his brother remaining stationary on earth.

Still, it does make time a much less well defined quantity, doesn't it?

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*Here is a lesson about the need for caution as to what "makes sense" in science. Nothing would seem more sensible than the observation that a stone tossed into the air falls back to earth; it would be surprising if the stone failed to do so. Yet upon closer study this simple event is seen to involve the metaphysical difficulties of action at a distance, difficulties which achieve a measure of intuitive resolution only in terms of the strange conception of virtual gravitons. This may serve as a warning that what passes for an understanding of simple things may well be no more than tacit consensus to stop asking questions.*

Victor Guillemin
*The Story of Quantum Mechanics,* Scribners, NewYork (1968), p. 183.

*Such questions as the origin of the universe, the destiny of man, the meaning of life, etc., cannot be answered with the tools for gaining knowledge that man possesses. Insight into these questions can only be gained by revelation. This has been the position of the Judaeo-Christian tradition for thousands of years. Man cannot approach God by himself; God must stoop to man.*

Harold F. Roellig
*The God Who Cares,* Branch Press, N. Y. (1971), p. 151

Dialogue

# PALEONTOLOGIC EVIDENCE AND ORGANIC EVOLUTION

***The existence and significance of paleontologic evidence, and arguments for or against the validity of organic evolution.***

JOHN N. MOORE

ROGER J. CUFFEY

*This is the second in a series of Dialogues to be presented in the pages of the* Journal ASA. *Each published Dialogue is the result of many months of correspondence and feedback between the participants, during which time every effort is made to eliminate extraneous claims and criticisms.*

*Like the first Dialogue, this second discussion is also concerned with that perennial topic: evolution. Such discussions of evolution may be broken down into at least four sub-groups. First there is the discussion of the possibility of evolution in view of the Scriptural revelation; this was the subject of the first Dialogue published in the June* 1972 *issue of the* Journal ASA. *Second there is the consideration—and this is the purpose of this Dialogue—of whether the available evidence indicates* that *evolution has taken place. Third is the consideration of* how *evolution could have occurred. And finally there is the question of the compatibility of an acceptance of organic evolution with a Christian worldview. Attempts to intermix these four basic questions so as to confuse their differences can only result in misunderstanding.*

*Readers continue to inquire as to why we bother to discuss the question of evolution, reliving as it were the days of the Scopes trial in a day far removed in sympathy and need. Our answer must be that we exist to serve our readers, and it is clear that a sizable minority of our readers consider evolution not only to be a vexing problem, but even one of ultimate and vital concern to their Christian life. Without belaboring the subject inappropriately, therefore, we hope that our occasional excursions into this area will prove beneficial to our readers.*

## THE POSITION OF JOHN N. MOORE

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### Introduction and Definitions

Over 110 years after the publication of Charles Darwin's book, *The Origin of Species* on November 24, 1859, we hear and read, repeatedly, about evolution stated *as fact*, in unhesitating fashion, by leading evolutionists. Julian Huxley has said so in as many words on many occasions and in written form. In 1959, Huxley claimed even that the universe had evolved, the earth had evolved, life evolved, man evolved, and man's culture in sum total had evolved.

In 1966, the now deceased Hermann Muller was instrumental in gaining signatures of close to 200 prominent scientists in support of the idea that evolution is as well established as the rotundity of the earth. And Theodosius Dobzhansky has said that evolution is as well established as anything could be, according to all those who are in full possession of the data available.

Little room for credibility seems left for that minority of scientists (See Olson, 1960), who assert quite boldly that evolution is illogical and *not* at all *biological*. Nor is some imaginary credibility gap reduced much by someone challenging Gavin de Beer, who has maintained in print that the certainty of evolution is comparable to that of the system of Copernicus, or that of Newton. Yet, I will assert that evolution is *not at all comparable* to the systems of either Copernicus or Newton with regard to logical precision or probative strength. What can be the basis of such an allegation?

Actually many, many evolutionists *believe* that evolution *is* comparable to the Newtonian theory in logical precision and probative value, essentially because they *equate* evolution with natural selection. Evidently evolutionists labor under this impression because they feel as de Beer, i.e.,

(*continued on page* 162)

# THE POSITION OF ROGER J. CUFFEY

(*Professor Roger J. Cuffey is active in the field of paleontology, and is in the Department of Geosciences, The Pennsylvania State University, University Park, Pennsylvania* 16802.)

## Introduction

Practicing paleontologists today, regardless of personal philosophical outlook, unanimously agree that the varied organisms inhabiting the earth originated by a process of gradual, continuous development or evolution over long periods of prehistoric time. Because the case for organic evolution had been adequately demonstrated in the late 1800's (principally by paleontologic evidence), scientists in this century turned their attention to many other important subjects. Consequently, most have been surprised by (Lewontin, 1971) and also ill-prepared to cope with the recent reappearance of anti-evolutionary ideas (such as Morris, 1963; Moore, 1970a, 1970b, 1971a, 1971b; Moore & Slusher, 1971). Therefore, presenting the paleontologic evidence relevant to the concept of evolution is most timely, particularly for an audience like that of the *Journal ASA*.

The participants in the current controversy about evolution seemingly agree that fossils (the study of which comprises the science of paleontology) are the remains (or direct traces) of formerly living organisms, preserved in the earth's crust since prehistoric times. This conclusion is incontrovertibly supported by the complete spectrum observable within the earth's crust between recently dead organisms and highly altered fossils.

In addition to the morphology of fossils, a paleontologist studies also various aspects of their distribution within the earth's crust. As Van de Fliert (1969) has ably discussed, the rock layers comprising that crust reveal a chronological framework (usually stated succinctly as the standard geological time scale) for the earth's history. This basic framework, founded upon repeatable observations of the succession of rock strata, is quite independent of any concept of organic evolution (Van de Fliert, 1969, p. 75, 77); in fact, the standard time scale historically was worked out half a century before evolution was proposed and demonstrated.

## Fossil Sequences

As a consequence, we can examine the fossils entombed in chronologically successive rock layers, and thereby learn what organisms inhabited this planet during successive intervals of past geologic time. When we do this, we find that the fossils naturally form sequences showing gradual and continuous morphologic changes from earlier forms to later forms of life, sequences which make evolutionary interpretations ultimately inescapable.

As working paleontologists interested in the history of particular organisms, we locate for detailed study a relatively thick succession of fossil-bearing rock layers whose observable physical features indicate continuous and uninterrupted deposition over a comparatively long time interval. We next examine those layers for the fossils in which we are interested. We initially find a few fossils, scattered widely among the different layers. Studying these specimens usually shows noticeable morphological differences between ones from various geologic ages, differences which we recognize formally in progress reports by referring the specimens to different species, genera, etc., depending upon the magnitude of those differences. Continued field collecting from the rock strata intervening between any two successive forms thus described frequently produces a series of fossils which begin with the earlier form, change in morphology gradually and continuously as we proceed upward, and end up with the later form. Because these new fossils demonstrate a morphological and parallel chronological transition from the earlier form to the later form, they are termed "transitional fossils".

## Examples of Transitional Fossils

If we read the paleontologic literature (especially if with the background of professional paleontologic training and experience; Cuffey, 1970, p. 93), we find that the fossil record contains many examples of such transitional fossils. These connect both low-rank taxa (like different species) and high-rank taxa (like different classes), in spite of the record's imperfections and in spite of the relatively small total number of practicing paleontologists. Because of the critical role which transitional fossils played in convincing scientists of the occurrence of organic evolution, paleontologists have been appalled that many otherwise well-informed persons have repeated the grossly misinformed assertion that transitional fossils do not exist. Consequently, after a relatively brief and non-exhaustive search of the literature immediately available to me, I compiled the examples of transitional fossils presented here. At least enough of these can be readily examined by anyone seriously interested in this topic that he can be convinced of their implications, I believe; collectively, they (and the many other similar ones which more extended search would find) comprise a massive body of evidence which cannot be ignored or explained away.

Although the broad patterns and many details in the history of life are well known, many other details remain to be learned. Because of the unevenness of our knowledge, therefore, we can conveniently distinguish several different types of transitional-fossil situations. Let us consider these now, starting with that situation where our knowledge is most complete, and proceeding through situations in which knowledge is progressively less complete.

First, some groups have been so thoroughly studied that we know sequences of transitional fossils which grade continuously from one species to another with-

(*continued on page* 167)

## MOORE'S POSITION

(*continued from page* 160)

> Only ignorance, neglect of truth, or prejudice could actuate those who in the present state of knowledge, without discovering new facts in the laboratory and in the field, seek to impugn the scientific evidence for evolution. (de Beer, 1958)

But a close, rigorous check of the de Beer article explicates the fact that he *has equated* literally the term "natural selection" with "evolution", and then subsequently proceeded to substitute for "natural selection", the term "evolution". And de Beer and many, many evolutionists make the *tacit assumption* that substantial experimental and field data that may be used to support the concept of natural selection are also useful as support for evolution.

Thus I find it necessary to raise questions of logical exegesis with regard to primary methodological issues associated with evolutionary theory and interpretations of several groups of physical data. It would be possible to offer extensive discourse around such topics as: a) use and abuse of *ad hoc* hypotheses, b) *ex post facto* explanations, c) the problem of definitions, d) methodological requirements of genuine scientific hypotheses, e) probability arguments involved in evolution theory, and f) the problem of untestable hypotheses.

Also I find it necessary to explicate the failure of many, many evolutionists to recognize overtly the *definite limitations* of scientific methodology. As time-binding organisms, human beings functioning as scientists are *still* limited in observational capacity beyond naked eye study to whatever extensions are possible through microscopes, telescopes, ultra-speed films, spectroscopes, and similar instrumentation. And direct physical data for the historical period of the past may be studied in archeology and similar work *only* some 3,000 years before the present. Thus *all* discussion about origin of the universe, the earth, life, man, and man's culture—*a la* the previously mentioned statement by Huxley—is *pure conjecture*.

As background to a discussion of physical evidence and evolution, an explication of the meaning of the word "science" or an answer to the question, "What is science?", is apropos. Of course the word "science" comes from the Latin for knowledge; and, according to a common dictionary definition, science is knowledge attained through study or practice. But this definition is obviously much too broad to be of much value. For a more coherent definition we find:

> Any body of doctrine or collection of truths is scientific to the extent that it yields the power to predict in relation to the subject matter of its choice. (Somerville, 1941)

And a decade later the following definition was offered:

> Science is an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation and are fruitful of further experimentation and observation. (Conant, 1951)

And thirdly the Oxford Dictionary contains this formal definition:

> A branch of study which is concerned either with a connected body of demonstrated truths or with observed facts systematically classified and more or less colligated by being brought under general laws, and which includes trustworthy methods for the discovery of new truth within its own domain.

Thus, from these three definitions scientific activity involves the search for facts that can be observed or demonstrated, and laws which have been demonstrated also, by means of *trustworthy* methods of discovery. Then at the core of scientific method or methods is *experimental repeatability* or reproducibility. Other synonyms for this core idea are *predictability* and/or control. As a leading paleontologist has pointed out:

> The important distinction between science and those other systematizations (i.e., the arts, philosophy, and theology) is that science is self-testing and self-correcting. The testing and correcting are done by means of observations that can be *repeated* with essentially the same results by normal persons operating by the same methods and with the same approach. (Emphasis added) (Simpson, 1962)

Therefore, the heart of scientific method is the problem-hypothesis-test process. And, necessarily, the scientific method involves *predictions*. And predictions, to be useful in scientific methodology must be subject to test empirically. But is this the case with regard to the theory of evolution? Are observations involved that are repeatable?

Thus, many scientists who have critically analyzed the theory of evolution have found that a General Theory of Evolution must be distinguished from a Special Theory of Evolution. (See Kerkut, 1960)

A proponent of the *General Theory of Evolution*, which is the "Amoeba to Man" thesis, would state that all living things in the world have arisen from a single source that came from an inorganic beginning. Thus, according to the General Theory of Evolution, the first living cell "evolved" into complex muticellular forms of life, these gave rise to all forms of invertebrates; in turn, invertebrates "evolved" into vertebrates; fish into amphibia, amphibia into reptiles, reptiles into birds and mammals, early mammals into primates, and finally primates "evolved" into man. Without question this is the basic meaning of the term "evolution" for most people.

However, a proponent of the *Special Theory of Evolution* would state that many living plants and animals *can be observed*, over the course of time, to undergo changes so that new varieties are formed.

Presentation of the General Theory of Evolution *as fact* has no basis in science. The General Theory of Evolution is totally without foundation in physical evidence as is shown presently.

But a final word of introduction is needed. I assert that evolutionists, who speak and write as "historical" geologists or biologists, do so as men who present their *imagined narratives* about the so-called geological past, and produce *imagined narratives* about supposed phylogenetic trees of living things. Geologists, especially, must be reminded constantly that they study only the present. Then they interpret and extrapolate about the past, and in so doing they leave empirical science.

Yet, such *imagined narratives* have been offered for a very long time in geology textbooks as "accounts" of past "history" of living things. Such imagined narratives have been presented so *persuasively*, for such a long time, that most geologists, paleontologists, and biologists have come to accept them *as fact*, as if the events imagined and the supposed changes in living

things had occurred actually. Thus, we find Huxley, Muller, Dobzhansky, and Simpson in the lead as spokesmen for the position that general evolution is fact.

## The Real Situation

What is the real situation? Just what is the situation about general evolution *as fact*? The real situation is that discussion about general evolutionary thought or theory involves a paradigm case of the "interminable dispute" in scientific discourse. Discussion about general evolution is plainly a conceptual dispute, or a quarrel of *faiths*. There is no *experimentum crucis* possible. And there is no need for new physical evidence as de Beer would have his readers believe. There are no private facts for evolutionists; and no private facts for scientists who are not disciples of the Evolutionary Faith. Disagreements are *conceptual* in nature, and *not factual* in character. The same physical data of the geological record, animal breeding records, and plant breeding records are used by both evolutionists *and* other scientists.

Also, the real situation could be phrased in terms of "conflict questions", as was done in the doctoral thesis, "Methodological Issues in Evolutionary Theory", by Wing Meng Ho for his 1965 degree at Oxford University. Dr. Ho maintains that these conflict questions are no longer problems of *science*, but problems in *philosophy*. We do not need more physical evidence as per de Beer for conflict questions that center in such dichotomies as, 1) mechanism versus vitalism, 2) mechanistic versus organismic biology, 3) non-teleological versus teleological approaches, or 4) non-evolutionary versus evolutionary origin of matter and life.

Ho sees that empirical versus non-empirical questions must be faced, when conflict questions are formulated. And theories of general evolution involve conflict questions about origin that are quite non-empirical. Rather than collection of more facts, solution or dissolution of conflict questions on origins and general evolution require analysis and clarification of points at issue according to a particular viewpoint re *meanings, definitions* or *interpretations*. Resolution of conflict questions will not come by gaining new physical evidence, but by making decisions of intent to construe and apply certain key-terms in some definite manner. Such key-terms might be listed as,

1. cause, or causes
2. character
3. create
4. development
5. evolution
6. explanation
7. kind
8. life
9. mutation
10. origin
11. prediction
12. probability
13. purpose
14. species
15. succession
16. variation

But, in the main, evolutionists *seem* unaware of, or uninterested in, precision of definitions. This seems *especially true* when evolutionists *equate* "evolution" and "natural selection", or *equivocate* "evolution" and "variation". Or when evolutionary biochemists indiscriminately interchange "create" and "synthesize", or "creation" and "synthesis". Such neglect of detail seems contradictory to the spirit of empirical science.

When scientists criticize general evolutionary thought or the use of terms by evolutionists, when they raise objections to teaching general evolution *as fact*, as if it were or is observable, they are merely insisting on elementary scientific procedures. The very essence of suspended judgment, as an attitude of scientists, and further the self-correctiveness of scientific methodology (which is so often pointed to as a criterion to separate science from other disciplines of man, as per Simpson above), are *both* properly served when scientists ask pointed conflict questions above general evolutionary theory or thought.

Scientists, who criticize evolution, experience conflict when they ask questions such as, "If a machine is the result of a draftsman and engineer, and if the draftsman and engineer are the result of their genetic codes, then what is the organizing principle or pattern for these genetic codes?" If this question is pushed back far enough to involve the concept of beginning, or origin, then solution or dissolution of that conflict question will come only after certain key-terms are consistently employed by evolutionists.

In sum, then, with regard to the real situation, many scientists maintain that theories of general evolution are not suitable for the study of origin, whether concern is for the origin of the universe, the earth, life, man, or man's culture. It would seem that something as important to scientists as the origin of the universe should not be discussed in basic terms which are employed in a contradictory manner.

## "Evidences" for General Evolution Examined

Therefore, it becomes necessary to examine the broad theory of general organic evolution, which entails development of an *imaginative narrative* about the "history" of living things, about their origin and changes in the past to the present. The thesis of general organic evolution has been well known ever since Charles Darwin made it acceptable to the intelligentsia of his time. Specialists and non-specialists are acquainted with the evolutionary thesis that all living things came from organisms of the past which came from some least complex beginning and in turn from an inorganic origin. Thus, change in living things from least complex to most complex is the "end" involved in general evolution. But the "means" involved whereby that "end" supposedly was and is accomplished was *imagined* by Darwin to be "natural selection", and evolutionists still hold this to be a *prime* mechanism of change.

Darwin used major chapters of his book to expound upon so-called "evidences" for general evolution and the same headings are useful today for reference to classified physical data as per the following: a) geological record (succession), b) morphological affinities, c) geographic distribution, d) embryological similarities, and e) rudimentary or vestigial organs. (Blood or protein analyses would be added by some today.)

At this point some scientists are quick to point out the practice of *ex post facto* explanations. No one has ever seen one type or form of an animal change into another type or form of an animal, and hence all use of physical evidence under the above headings partakes of the practice of formulating explanations *after the fact*. Darwin and all orthodox disciples of the Evolutionary Faith have diligently sought after physical evidence to substantiate the general evolutionary thesis already expressed simply as "Amoeba to Man", or as one high school textbook is sub-titled: "Molecules to Man". Yet all discussion of so-called "evidences" under the above

mentioned headings is done *after the fact*. Hence the crucial point still remains that the basic concepts always involve untestable hypotheses.

And in terms of their methodological approach, scientists are obligated to point out that the entire structure of general evolutionary thought rests upon the geological record—the supposed historical record of what actually happened.

Yet the whole discussion of supposed succession of horses, or any other type or form of living thing as based upon the geological record, partakes unavoidably of the logical fallacy of *post hoc ergo propter hoc* ("after this, therefore, because of it"). The fallacy involves the error of taking something as the cause for another thing merely because of being earlier in time. That is, merely because the remains of one kind of organism lie in a stratum under remains of another kind of organism, it does not necessarily follow that the "lower" is the cause (or ancestor) of the "upper".

Thus some scientists are attempting to construe and apply certain key-terms with regard to the geological record. Succession does *not* afford *sufficient* and *necessary* grounds for claiming one organism as the ancestor of another. (Succession in rock strata is not the same as clear genetic relationship established through interfertility tests, which many evolutionists hold as criteria for establishing the species concept.)

But most important of all is the fact that *all* of the physical "evidence" used by evolutionists under the above headings are made plausible and persuasive only because of *one basic assumption*. Underlying the geological record, morphological affinities, geographic distribution, embryological data, rudimentary organs, and blood or protein analyses is one basic assumption, i. e., *the degree of relationship of organisms depends upon the degree of similarity of organisms*. In short, if organisms look alike, then they are related, according to the degree of similarity. If organisms do not look alike then they are not related, or only distantly related, according to the degree of similarity. But, in no respect, as many scientists point out, are genetic relationships afforded the general evolutionary thinker by physical data grouped under the above headings. No genetic relationship is established through exercise of the *assumption* that the degree of relationship depends upon the degree of similarity.

And most conclusively, as far as methodological issues are concerned, only *circumstantial* evidence is involved throughout all the listings of classified physical evidences used to support evolution from "Amoeba to Man", or for that matter, from "Molecules to Man". Relationships expounded are purely *conjectural* because they *cannot be tested*. All these circumstantial evidences involve *extrapolations* quite beyond the realm of genuine scientific investigation, i. e., experimental analysis. All hypotheses of relationships of general evolutionary nature are *untestable;* and, therefore, are purely conjectural and speculative. It would appear, therefore, that these hypotheses are doomed forever to remain a part of the untestable dogma of the Evolutionary Faith.

At this point many scientists would open discussion of the validity of *circumstantial evidences* to the establishment of scientific truth. Being reminded that we *cannot equate* "natural selection" to "evolution", and we *cannot equivocate* "evolution" with "variation", critical scientists press hard on the fact that general evolutionary theorists, in using circumstantial evidences almost exclusively, are involved with an important weakness and seriously irremediable defect in their thinking. This is their heavy dependence on the *argument from analogy*. An analogy can be given:

> If (A) is known to have properties "P" and some additional property "R" and resembles (A'), in that (A') is known to have properties "P", then (A) is expected to have property "R".

Darwin depended on an analogy between *artificial* selection and *natural* selection, as he discussed his supposed mechanism for general evolution. He formulated the reasoning that the artificial selection of the breeder and fancier of domestic animals, about which he could observe and gain actual physical data, was *analogous* to his imagined natural selection of the better adapted organisms for survival. But the analogy breaks down.

In the first place, artificial (breeder) selection must be accomplished in accordance with certain desired or determined criteria. The plant breeder has distinct characteristics which he wants to retain, improve, or even remove, if possible, for his particular desire (criteria). The breeder works with plants to bring about distinct departures in characters according to this design. This also is true of the animal breeder or fancier.

In the second place, proponents of the doctrine of natural selection state that it occurs *without any set criteria*. There are no distinct characteristic changes planned or designed. Only the interaction of organism(s) (populations) and the environment are involved. Plants change according to wind pollination or as insect pollination occurs. Animals reproduce and control a territory and change according to interaction with the environment, *somehow*. There are *no* criteria. Furthermore, supposed changes are slight, minute, hardly noticeable variations of the genome. Actually most distinct departures (most mutants) are eliminated, and field and laboratory data are better interpreted that gene stability is the most proper conclusion from empirical data.

Artificial selection, therefore, is not analogous to natural selection, or *vice versa*. There is no resemblance between A and A' because the properties associated with A are different from the properties associated with A. Thus, there is no adequate comparison of artificial selection and supposed natural selection and the analogy fails.

### Genetics as "Evidence" for General Evolution

As a last defense for general evolution, many will demand, "Well, what about genetics? Aren't evolutionists on the correct path when they use data from genetics to try to support their thesis of 'amoeba to man' evolution? Is it not true that variations have been shown to be transmissible?" Yes. "Is it not true that changes of genetic material have been shown to be of a fixed nature?" Yes. "Is it not true that changes of genetic material are constantly arising?" Yes.

But many scientists are asking, "Is there *any* evidence of *empirical* nature that favorable variations have *accumulated* so as to effect overt general evolutionary changes?" Again, a conflict question has been reached, and the problem of defining the meaning of terms must be faced. "What is a viable mutation?" "What is a variation?" "What is an evolutionary change?"

Clearly, even evolutionists must admit that no new organs or organisms, re type or form, have come about by the shuffling and reshuffling of genes. It is true that

the researcher may conclude from his experimental data that changes in eye color, in eye shape, in eye pattern in fruit flies do occur, but the eyes *always* remain *Drosphilia* eyes, if that is the organism with which he deals in his research! Recombinations of genetic materials do *not* bring about new types or forms. Such changes are always within limits of known types or forms of organisms.

That inviolate *genetic* barriers exist between major groups of living things may be stated conclusively on the basis of available genetic evidence. Unbridgeable breeding gaps are known; no amount of reference to ploidy and or chromosomal rearrangements will truly erase the undeniable evidence that breeding gaps between major groups of living things do in point of fact actually exist.

Anyway any reference to different phenomena of ploidy and chromosomal rearrangements constitutes nothing more than *ad hoc*, untestable hypothesizing, as far as any attempt to explain any relationships between or among major groups of animals or major groups of plants is concerned. Absolutely no *genetic* connections are ever established between major groups of living things by means of any mechanisms involving ploidy and chromosomal rearrangements.

But there is another problem here. Are mutations, or more properly mutants, truly raw materials upon which "natural selection" operates, as is so commonly claimed by such as Theodosius Dobzhansky? He has admitted that mutants do not of themselves involve anything new (Dobzhansky, 1953). Mutations are sources only of differences of characteristic expressions of traits *already in existence*, and not a source of new traits. Mutations result only in changes *within* the existing genetic structure. Therefore the fundamental genotype remains unchanged as far as *traits* are concerned.

Thus the contention so often heard and read that mutations supply the raw materials for "natural selection" to bring about "amoeba to man" evolution involves a whole hierarchy of *ad hoc* hypotheses, which are void of testability. Once again the *untestable* hypothesis is encountered, which is so common in general evolutionary theory or thought.

Since the vast majority of mutations are lethal or cause impairment of physiology of the organism, since the gene mutation hypothesis suffers from the difficulties of the *pathological* nature of and the great rarity of mutational changes, it follows that mutations are *not useful* as supporting evidence for general evolution, that is, "molecules to man". And public attestations to the "failure" of the mutational theory are appearing in print more and more. As one scientist has written: "But who can tell us how point mutations and sundry tape doublings, crossings, and writhings made the oak and squirrel, the gull and the gall by summing up the changes in many a piece of enzymes?" (Morrison, 1971 and Davis, 1970; Haskins, 1971)

Any hypotheses about "suppressor" genes (Fisher, 1932), undetected viable mutations (East, 1936), or changes in the evironment favoring certain mutations (Dobzhansky, 1953) must be labelled *untestable*. And a similar generalization can be made of more recent attempts to "explain" change of one kind of organism into another kind of organism by way of mutations and other gene manipulations.

Thus an important methodological issue with regard to physical evidence from genetics is the fact that the favorite hypotheses of evolutionists fail to satisfy the *criterion of testability*, and because of this, they lie *outside* the realm of scientific investigation. In genetics, many scientists detect the repeated practice of *ad hoc* hypotheses, which are fully *untestable*, and detect heavy commitment by general evolutionists to extrapolation and interpretation of terms that are *vague* and *ambiguous*. "What is a viable mutation?" "What is a useful mutation?"

In considering for a moment that last question, a change of color in moths or alteration of food use by bacteria might be cited as results of "favorable" or "useful" gene mutations. Nevertheless such changes of moths or bacteria are only *within* a certain genus, and *not across* limits of genera. Therefore, any thought to consider any so-called "favorable" gene mutations as possible mechanisms for changes across limits of known kinds, which are the type of changes required if the general theory of evolution is to be given any empirically sound basis, partakes again of dependence upon *ad hoc*, untestable hypotheses.

In summation, with regard to physical evidence from genetics, the point that needs to be emphasized over and over again is that minor changes can and do occur in living organisms, but the changes are always within bounds of a certain type, form, or kind. And in passing, it should be noted that even in the fossil record, basic types, forms, and kinds are clearly recognizable even as we see them today in many, many examples.

Of course, this is in exact agreement with the pattern found in Genesis 1, that is, "after their kind", "after his kind". This can be extended by the statement that all the known physical evidences can be fitted into the Genesis account in great consistency with all the better scholarship; and this can be done better by far than attempts to fit the physical evidence into imagined, speculative narratives of evolutionary theorists.

On the basis of the most rigorous scholarship, the conclusion is inescapable that *no* transitional forms of true *genetic* relationship or connection can be established from breeding records, which constitute the only truly repeatable, demonstrable physical evidence (hence really scientific). There is truly an irrefutable case that can be made for "fixity of kinds".

## Conclusion

Because of failure to follow fundamental scientific procedures, *especially* with regard to origins, because of the extensive commitment of general evolutionists to sheer circumstantial evidences, because of the failure of mutational hypotheses to provide anything pertaining to truly *new* physical traits, it is clear that theories of general evolution are not suitable for the study of origins, whether concern centers on origin of the universe, the earth, life, man, or man's culture. And equally important, theories of general evolution cannot be presented *as fact* without implication in fraud and/or *hoax*.

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### *Cuffey's Critique of Moore's Position*

The critical role of paleontologic evidence in demonstrating organic evolution to the satisfaction of the scientific community seems largely overlooked by writers of Moore's persuasion. Consequently, presenting such evidence here in non-technical fashion seems to me to be the most useful contribution which these papers can make toward resolving the evolution controversy.

Moreover, the arguments used against this paleontologic evidence by anti-evolutionists like Moore are woefully lacking, because they rest upon misunderstanding or oversimplification of actual paleontologic procedures. Four brief comments suffice to elaborate this point.

First, as an example, Moore's suggestion that the stratigraphic succession of fossils is logically fallacious is based upon a grossly and erroneously oversimplified view of the nature of the fossil record. As explained previously in my position paper, it is important not only that one organism's remains lie below those of another. It is also essential, for demonstration of evolutionary relationship between the two, that the intervening strata contain other fossils which grade continuously in both morphology and chronologic-stratigraphic position from the lower to the upper form.

Similarly, as a second example, the curious notion that studying past events involves only speculation and untestable hypotheses reflects serious ignorance. Actual paleontologic practice is in fact dominated by observational investigation of the fossil materials which would have been produced under various possible circumstances, in an attempt to determine how nature most probably did behave in the past.

Third, as previously indicated, the paleontologic record provides an immense and overwhelming quantity of evidence supporting evolutionary concepts. In general, retreat into oversimplified philosophical arguments against such a massive body of verifiable observational evidence suggests strongly an inability to convincingly counter the clear implications of that evidence.

Fourth, Moore states that disagreements concerning evolution are "quarrels of faiths". In contrast, as indicated earlier, I believe that such disagreements are readily resolvable by scientific data. I sincerely hope that those of his persuasion will reject one possible implication of his statement—namely, that no matter what relevant evidence is newly presented to them, they will not consider the implications of that evidence!

Retaining open minds about controversial concepts is necessary, until sufficient evidence accumulates. However, enough scientific evidence is already at hand to remove any reasonable doubt about the validity of the concept of organic evolution.

Other points raised by Moore are adequately covered in my position paper, and therefore need not be repeated here.

### *Moore's Rebuttal*

In rebuttal to Cuffey's critique, I assert that I am quite aware of "the critical role of paleontologic evidence" with regard to supposed organic evolution. It is my concern about *misuses* of such information that prompts me to point out *again* that no demonstration *empirically* of general evolution has been accomplished. To allude to the "satisfaction of the scientific community" seems to me to be no more than an appeal to the fallacious idea that truth is a matter of voting.

The "scientific community" was satisfied with the Copernican formulations; and yet, Kepler wrought great and significant changes. The scientific majority was satisfied with Newtonian physics; and yet, Einstein wrought great and significant changes. Contemporary scientists of Charles Darwin were at one moment satisfied with their interpretations of Genesis 1; and yet, Darwin wrought great and significant changes.

It is just because of my understanding and appreciation of the complexity of actual paleontological procedures that I make bold to *tell it like it is*, and urge fellow colleagues in the scientific community today to realize, that now is the time for all scientists to reconsider general evolution. A period of over 110 years, since Darwin's book appeared, is time enough to insist that evolutionists either put up *hard physical evidence* for general evolution, or else yield in their arrogant dogmatism in writing and teaching about general evolution *as fact*. To challenge scientists in astronomy, biochemistry, botany, embryology, geology, paleontology, and zoology to provide *hard physical evidence* is done in the spirit of self-correctiveness of scientific endeavor mentioned in the Simpson quote in the Introduction of my position paper.

And Cuffey's use again of such words as "demonstration", "observational", and "implications" in his critique must be challenged. He did not write of, and he cannot provide, any *empirical* demonstration of genetic lineage between or across limits of kinds of organism. He joins his reference to "observational" with "possible" and "probable" and thus provides further basis for my case that he *does deal inescapably* in "speculation and untestable hypotheses". And when he asks that critics of evolution consider the implications of physical evidence, I offer that I have done just that per my position paper, and I repeat that the *real situation* that prevails is *total absence* of any physical evidence upon which to base the General Theory of Evolution. Any discussion of change of species or genetic variation *within* limits of kinds of organisms must never be confused with general evolution.

To speak of "validity", as Cuffey does in his next to closing statement of his critique, leads directly to the whole thrust of my criticisms of any presentation of general evolution *as fact*.

There is immense "reasonable doubt" about the

validity of *general evolution*. There is immense "reasonable doubt" that general evolution has ever occurred. *All* of the physical data from comparative anatomy, comparative embryology, rudimentary (vestigial) organs, blood and protein analyses, Mendelian and population genetics, *and* the fossil record may be fitted more validly into the creation account of Genesis 1, than into any speculative, imaginative narrative of men about general evolution.

I hope sincerely that those of Cuffey's persuasion will reject one possible implication of his statement before concluding his position paper, that Christians "will need to integrate evolutionary process into their views as being the proximate means which God uses to create various forms of life"—namely, the implication that the ways of men, the ideas of men, the traditions of the world must be given credence over the ways of Christ, who said, "male and female created he them". If Christians accept the ideas of men about general evolution, then they may be consciously or unconsciously beguiled (Col. 2:8 and Eph. 4:14) to accept a human substitute about origins for the Word of God, which is the one and only source of *unchanging* answers for people of all generations about origins of the universe, the earth, life, man, and man's culture.

Today, Christians can declare confidently that "fixity of kinds" is *the* scientifically documented prediction from the creation model, that is, supported by *all* physical evidence. And "fixity of kinds" might well be understood as the modern day equivalent of the Biblical "after his kind" or "after their kind".

## CUFFEY'S POSITION

(*continued from page* 161)

out break (Table 1), sometimes linking several successive species which cross from one higher taxon into another (Table 2). We can say that situations of this kind display *transitional individuals*. Among the many available examples of transitional individuals, some particularly convincing examples can be noted. These involve:

*corals* (Carruthers, 1910, p. 529, 538; Easton, 1960, p. 175; Moore, Lalicker, & Fischer, 1952, p. 140; Weller, 1969, p. 123),
*gastropods* (Fisher, Rodda, & Dietrich, 1964),
*pelecypods* (Kauffman, 1967; Kauffman, 1969, p. N198-200; Kauffman, 1970, p. 633),
*echinoids* (Beerbower, 1968, p. 136, 138; Kermack, 1954; Nichols, 1959a, 1959b; Olson, 1965, p. 98; Rowe, 1899).

Second, other fossil groups have been well enough studied that we know sequences of transitional fossils comprising a series of chronologically successive species grading from an early form to a later form (Table 3), again sometimes crossing boundaries separating different higher taxa (Table 4). This type of situation can be termed *successive species*. Published descriptions of successive species lack explicit discussion of individuals transitional between the species, although frequently such exist in the author's collection but are not discussed because they are not directly pertinent to his purposes. Again, some especially persuasive examples of successive species can be seen, among:

*foraminiferans* (Wilde, 1971, p. 376),
*brachiopods* (Greiner, 1957; Raup & Stanley, 1971, p. 124),
*pelecypods* (Easton, 1960, p. 348; Kay & Colbert, 1965, p. 327; Moore, Lalicker, & Fischer, 1952, p. 447; Newell, 1942, p. 21, 42, 47-48, 51-52, 60, 63, 65; Olson, 1965, p. 97; Stenzel, 1949; Stenzel, 1971, p. N1079-1080; Weller, 1969, p. 209),
*ammonoids* (Cobban, 1961, p. 740-741).

In many fossil groups, our understanding is relatively less complete, thus giving rise to a third type of situation which we can label *successive higher taxa*. Here, we may not have complete series of transitional individuals or successive species, but the genera (or other higher taxa) represented in our collections form a continuous series grading from an earlier to a later form, sometimes crossing from one higher-rank taxon into another (Table 5). Because genera are relatively restricted in scope, many series of successive genera have been published. However, families and higher-rank higher taxa are so broad in concept that they are not usually used to construct transitional-fossil sequences, although occasionally they are (Bulman, 1970, p. V103-104; Easton, 1960, p. 436; Flower & Kummel, 1950, p. 607).

Finally, in some fossil groups, our knowledge is quite fragmentary and sparse. We then may know of particular fossils which are strikingly intermediate

**Table 1.** *Examples of transitional individuals grading continuously between successive species within the same higher taxon (genus).*

*Algae*: Gartner, 1971.
*Angiosperms*: Chandler, 1923, p. 124, 132-133; Chaney, 1949, p. 197-198; Stebbins, 1949, p. 230-231.
*Foraminiferans*: Barnard, 1963, p. 82, 90; Rauzer-Chernousova, 1963, p. 48.
*Corals*: Carruthers, 1910, p. 529, 538; Cocke, 1970, p. 13; Easton, 1960, p. 175; Moore, Lalicker, & Fischer, 1952, p. 140; Ross & Ross, 1962, p. 1182-1184; Weller, 1969, p. 123.
*Bryozoans*: Cuffey, 1967, p. 38-39; Cuffey, 1971a, p. 158; Cuffey, 1971b, p. 38; Elias, 1937, p. 311, 317.
*Brachiopods*: Ziegler, 1966, p. 532.
*Gastropods*: Fisher, Rodda, & Dietrich, 1964; Lull, 1940, p. 19; Sohl, 1967, p. B12-13, B15-16; Thomson, 1925, p. 96.
*Pelecypods*: Charles, 1949; Charles & Maubeuge, 1952, 1953a, 1953b; Heaslip, 1968, p. 58, 69, 77-79; Imlay, 1959; Kauffman, 1965, p. 8-21; Kauffman, 1967; Kauffman, 1969, p. N198-200; Kauffman, 1970, p. 633; Kay & Colbert, 1965, p. 325; Lerman, 1965, p. 416, 431-432; MacNeil, 1965, p. G35-36, G42; Raup & Stanley, 1971, p. 191, 257; Stenzel, 1971, p. N1077; Waller, 1969, p. 26.
*Ammonoids*: Cobban, 1958, p. 114; Cobban, 1962a, 1962b; Cobban, 1969, p. 6; Cobban & Reeside, 1952, p. 1020-1022; Easton, 1960, p. 456.
*Trilobites*: Brouwer, 1967, p. 152-155; Kaufmann, 1933, 1935; Raup & Stanley, 1971, p. 292; Simpson, 1953, p. 250.
*Echinoids*: Beerbower, 1968, p. 136, 138; Durham, 1971, p. 1126-1127; Hall, 1962; Kermack, 1954; Nichols, 1959a, 1959b; Olson, 1965, p. 98; Rowe, 1899.
*Conodonts*: Clark, 1968, p. 21-23; Scott & Collinson, 1959, p. 562.
*Mammals*: Osborn, 1929, p. 20-21; Simpson, 1953, p. 387-388; Teilhard de Chardin, 1950; Trevisan, 1949; Watson, 1949, p. 47; Wood, 1949, p. 188-189.

**Table 2.** *Examples of transitional individuals grading continuously between successive species, and crossing from one higher taxon into another.*

*Ginkgophytes*: Andrews, 1961, p. 337-339; Brown, 1943, p. 863; Franz, 1943, p. 323; Scagel *et al*, 1965, p. 484; Seward, 1938; Weller, 1969, p. 66.
*Angiosperms*: Chaney, 1949, p. 193-199; Elias, 1942, p. 70-71, 88-89, 109-122; Stebbins, 1949, p. 230.
*Foraminiferans*: Banner & Blow, 1959, p. 21; Barnard, 1963, p. 86, 88-89; Gimbrede, 1962, p. 1121-1123; Jones, 1956, p. 274; Papp, 1963, p. 352-353; Woodland, 1958, p. 803-808; Zeller, 1950, p. 19.
*Brachiopods*: Boucot & Ehlers, 1963, p. 48-51.
*Pelecypods*: Newell, 1942, p. 21, 59.
*Ammonoids*: Arkell, Kummel, & Wright, 1957, p. L113-119; Brinkmann, 1929, 1937; Brouwer, 1967, p. 156-158; Cobban, 1951, p. 5-11; Cobban, 1964, p. I10-14; Easton, 1960, p. 455; Erben, 1966; Krumbein & Sloss, 1963, p. 369; Olson, 1965, p. 105-107; Raup & Stanley, 1971, p. 264, 306-307; Spath, 1938; Wenger, 1957.
*Conodonts*: Rexroad, 1958, p. 1158.
*Mammals*: Hanson, 1961, p. 50-51; Scott, 1937, p. 417; Simpson, 1951, p. 114-121, 148, 217-228, 232, 236, 257, 265, 282, pls. 20, 31; Wood, 1949, p. 186.
*Hominids*: Coon, 1962; Howells, 1967; Kummel, 1970, p. 578-583; Le Gros Clark, 1964; Uzzell & Pilbeam, 1971, p. 615.

between two relatively high-rank higher taxa, but which are not yet connected to either by a more continuous series of successive species or transitional individuals. We can refer to these as *isolated intermediates*, a fourth type of situation involving transitional fossils, a type which represents our least-complete state of knowledge.

Isolated intermediates include some of the most famous and spectacular transitional fossils known, such as *Archaeopteryx* (Colbert, 1969, p. 186-189; Romer, 1966, p. 166-167). This form is almost exactly intermediate between the classes Reptilia and Aves (Cuffey, 1971a, p. 159; Cuffey, 1972, p. 36), so much so that "the question of whether *Archaeopteryx* is a bird or a reptile is unimportant. Both viewpoints can be defended with equal justification" (Brouwer, 1967, p. 161). The fossil onychophorans (Moore, 1959, p. O19; Olson, 1965, p. 190) and the fossil monoplacophorans (Knight & Yochelson, 1960, p. I77-83; Raup & Stanley, 1971, p. 308-309) have been regarded as annelid-arthropod and annelid-mollusk inter-phylum intermediates, respectively. Moreover, although invertebrate phylum origins tend to be obscure for several reasons (Olson, 1965, p. 209-211), recently discovered, Late Precambrian, soft-bodied invertebrate fossils may well alter that situation, particularly after certain peculiar forms are studied and compared with Early Cambrian forms (Kay & Colbert, 1965, p. 99, 103; Weller, 1969, p. 247).

Mention of this last prompts me to point out parenthetically that the appearance of shelled invertebrates at the beginning of the Cambrian has been widely misunderstood. The assertion is frequently made that all the major types of animals appeared suddenly and in abundance then. In actual fact, collecting in successive strata representing continuous sedimentation from Late Precambrian into Early Cambrian time reveals a progressive increase upward in abundance of individuals. Moreover, the various higher taxa—particularly the various classes and orders reflecting adaptation to different modes of life—appear at different times spread over the long interval between the Early Cambrian and the Middle Ordovician.

Finally, because of widespread interest in questions of man's origins, it is well worth emphasizing that a rather complete series of transitional fossils links modern man continuously and gradationally back to mid-Cenozoic, generalized pongids (see references in Table 2).

> In spite of statements to the contrary . . . , the fossil record of the Hominoidea, the superfamily containing man and the apes, is quite well known, and it is therefore possible to outline a tentative evolutionary scheme for this group (Uzzell & Pilbeam, 1971, p. 615).

## Potential Complications of the Paleontologic Literature

Non-paleontologist readers examining examples of transitional fossils mentioned above should be aware of several common occurrences within the professional paleontologic literature which could conceivably be confusing.

Historically, continued paleontologic research on any particular fossil group tends to move our understanding of its fossil record from the least-complete to the most-complete type of transitional-fossil situation. For example, early paleontologists recognized that the goniatite ammonoids gave rise to the ceratite ammonoids (successive higher taxa, in this case superorders or infraclasses; Easton, 1960, p. 436); later work indicated the successive species by which this transition was accomplished (Easton, 1960, p. 446; Miller, Furnish, & Schindewolf, 1957, p. L22). Other examples can also be cited (Simpson, 1953, p. 361-364; Cuffey, 1967, p. 38-39). Also, our ideas about particular lineages may sometimes change as more specimens are brought to light (Stenzel, 1971, p. N1068-1070, 1077).

Frequently, secondary references portray evolutionary lineages much more vividly than does the

**Table 3.** *Examples of successive species within the same higher taxon (genus).*

*Angiosperms*: Chandler, 1923; Chaney, 1949, p. 197-199; Elias, 1942; Stebbins, 1949, p. 230-231.
*Foraminiferans*: Barnard, 1963, p. 82; Bronnimann, 1950, p. 406; Cita-Sironi, 1963, p. 119-121; Hottinger, 1963, p. 306-307; Schaub, 1963, p. 288-290, 292-294; Wilde, 1971, p. 376.
*Brachiopods*: Berry & Boucot, 1970, p. 30-31; Dunbar & Waage, 1969, p. 113; Greiner, 1957; Raup & Stanley, 1971, p. 124.
*Gastropods*: Franz, 1932; Franz, 1943, p. 272; Sohl, 1960, p. 100.
*Pelecypods*: Dechaseaux, 1934; Easton, 1960, p. 348; Heaslip, 1968, p. 74-77, 79-81; Kay & Colbert, 1965, p. 327; Lerman, 1965, p. 416; Moore, Lalicker, & Fischer, 1952, p. 447; Newell, 1937, p. 40, 80; Newell, 1942, p. 21, 42, 47-48, 51-52, 60, 63, 65; Olson, 1965, p. 97; Schafle, 1929, p. 79; Stenzel, 1949; Stenzel, 1971, p. N1056-1057, N1077, N1079-1080; Weller, 1969, p. 209; Zeuner, 1933, p. 317.
*Trilobites*: Grant, 1962, p. 983-998.
*Crustaceans*: Guber, 1971, p. 15-16; Sohn, 1962, p. 1207; Swartz, 1945; Weller, 1969, p. 267.
*Carpoids*: Barrande, 1887; Weller, 1969, p. 297.
*Blastoids*: Beaver, 1967, p. S303-305.
*Graptolites*: Berry, 1960, p. 9.
*Fishes*: Boreske, 1972, p. 3-4.
*Amphibians*: Olson, 1965, p. 45-48.
*Mammals*: Lull, 1940, p. 189; McGrew, 1937, p. 448; Tedford, 1970, p. 671, 694.

original paper reporting them. For instance, contrast the original presentation of one coral sequence (Carruthers, 1910, p. 529, 538) with several later presentations (Easton, 1960, p. 175; Moore, Lalicker, & Fischer, 1952, p. 140; Weller, 1969, p. 123).

Sequences of transitional individuals or successive species are often, especially for teaching purposes, presented instead as more generalized sequences of successive genera. One ammonite lineage including transitional individuals between families (Spath, 1938; Arkell, Kummel, and Wright, 1957, p. L113-116) appears elsewhere as merely successive genera (Olson, 1965, p. 105-107). The various successive species of the horse lineages (Simpson, 1951, p. 114-121, 217-228, 282) are often summarized as successive genera (Hanson, 1961, p. 50-51; Scott, 1937, p. 417).

Similarly, for instructional purposes, some authors illustrate a series of fossils which show a progression in morphology, but which are not chronogically successive. These therefore are not evolutionary sequences, even though they resemble such. Two examples of such morphological series involve foraminiferans (Pokorny, 1963, p. 312) and nautiloids (Easton, 1960, p. 426).

In many instances, transitional individuals exist but are not reported explicitly as evolutionary lineages, for several reasons. Fully documenting such complete sequences is rather expensive in both research effort and publication cost; thus, many remain unpublished (Berry & Boucot, 1970, p. 30-31). Moreover, the practicing paleontologist sees little need to repeatedly reprove well-established concepts, especially when his primary concern is with other matters such as biostratigraphic dating (Berry, 1960, p. 9).

## Effect of Transitional Fossils on Taxonomic Practises

Still further, because the Linnean system of taxonomic nomenclature has been very useful historically, we tend to refer transitional individuals to that species which they resemble most, rather than calling attention nomenclaturally to their intermediate status (Bird, 1971; Crusafont-Pairo & Reguant, 1970). As a result, a casual reader might conclude erroneously that we see no evolutionary variations within species. However, the true situation is that paleontologists frequently ignore such variation because it is not pertinent to their immediate goals (Williams, 1953, p. 29), but that such variation is present as transitional individuals within the species (Anderson, 1971; Cuffey, 1967, p. 41, 85-86; Klapper & Ziegler, 1967; Scott & Collinson, 1959; Williams, 1951, p. 87).

Similarly, we also tend to refer transitional fossils to that higher taxon which they most resemble or to which their final representatives belong. Consequently, the fact that we are dealing with continuously gradational sequences may be obscured by our conventional practise of superimposing artificially discontinous, higher-rank taxonomic boundaries across such lineages (Olson, 1965, p. 100-101, 202-203; Van Morkhoven, 1962, p. 105, 153; Williams, 1953, p. 29; Cuffey, 1967, p. 38-39). As a result, for example, in the middle of sequences of transitional fossils bridging the conceptual gaps between the various vertebrate classes, we find forms which sit squarely on the dividing line between these high-rank taxa and which can be referred to either of two. In addition to *Archaeopteryx* between reptiles and birds (discussed previously), we can also note *Diarthrognathus* between reptiles and mammals, the seymouriamorphs between amphibians and reptiles, and *Elpistostege* between fishes and amphibians (see references in Table 5).

Higher taxa—from genera on up through phyla—are useful concepts in handling data concerning organisms (in fact, they constitute what the layman terms "major kinds" of organisms); however, they are artificial mental constructs rather than "basic facts of

**Table 4.** *Examples of successive species crossing from one higher taxon into another.*

*Ginkgophytes*: Andrews, 1961, p. 337-339; Brown, 1943, p. 863; Franz, 1943, p. 323; Scagel *et al*, 1965, p. 484; Seward, 1938; Weller, 1969, p. 66.
*Foraminiferans*: Berggren, 1962, p. 109, 116-126.
*Bryozoans*: Lang, 1921-1922; Easton, 1960, p. 268.
*Gastropods*: Fisher, Rodda, & Dietrich, 1964.
*Pelecypods*: Stenzel, 1971, p. N1057, 1078.
*Nautiloids*: Easton, 1960, p. 425; Flower, 1941, p. 526; Moore, Lalicker, & Fischer, 1952, p. 351.
*Ammonoids*: Arkell, Kummel, & Wright, 1957, p. L116; Cobban, 1961, p. 740-741; Easton, 1960, p. 446; House, 1970, p. 666-674; Miller, Furnish, & Schindewolf, 1957, p. L22; Wright & Wright, 1949.
*Crustaceans*: Glaessner, 1960, p. 40-41; Glaessner, 1969, p. R410-411.
*Crinoids*: Moore, Lalicker, & Fischer, 1952, p. 629.
*Echinoids*: Jackson, 1912, p. 231; Weller, 1969, p. 355.
*Reptiles*: Lull, 1940, p. 296; Olson, 1965, p. 99-101.
*Reptile—Mammal Transition*: Olson, 1965, p. 202.
*Mammals*: Kummel, 1970, p. 514; Lull, 1940, p. 524; Matthew, 1910; Nelson & Semken, 1970, p. 3734; Osborn, 1929, p. 35-37, 724, 761, 773, 784, 791, 801, pl. 48; Patterson, 1949, p. 243-244, 246, 263, 268; Scott, 1937, p. 429; Simpson, 1951, p. 148, 245; Wood, 1949, p. 188-189.

**Table 5.** *Examples of successive higher taxa (genera).*

*Coniferophytes*: Florin, 1951; Scagel *et al*, 1965, p. 491-492, 520-522, 596-597.
*Foraminiferans*: Dunbar, 1963, p. 42; Pokorny, 1963, p. 155, 192.
*Corals*: Wells, 1956, p. F364.
*Brachiopods*: Dunbar & Rodgers, 1957, p. 280; Shrock & Twenhofel, 1953, p. 346.
*Nautiloids*: Teichert, 1964a, p. K200-201; Teichert, 1964b, p. K325.
*Ammonoids*: Miller, Furnish, & Schindewolf, 1957, p. L23.
*Coleoids*: Easton, 1960, p. 476; Weller, 1969, p. 233.
*Blastoids*: Fay, 1967, p. S394-395; Tappan, 1971, p. 1087.
*Crinoids*: Moore, Lalicker, & Fischer, 1952, p. 631.
*Echinoids*: Kier, 1965; Tappan, 1971, p. 1088.
*Graptolites*: Moore, Lalicker, & Fischer, 1952, p. 726.
*Fish-Tetrapod (Crossopterygian-Amphibian) Transition*: Colbert, 1969, p. 71-78; Romer, 1966, p. 72-74, 86-88, 90; Romer, 1968, p. 71-72.
*Amphibian-Reptile Transition*: Colbert, 1969, p. 111-114; Romer, 1966, p. 94-96, 102-103; Romer, 1968, p. 86-87, 96.
*Reptiles*: Colbert, 1948, p. 153; Colbert, 1965, p. 170-171; Romer, 1968, p. 131, 137, 138.
*Reptile-Mammal Transition*: Beerbower, 1968, p. 477-480; Colbert, 1969, p. 130-144, 250, 254; Cuffey, 1971a, p. 159; Olson, 1965, p. 40-44, 193-209; Olson, 1971, p. 671-731; Romer, 1966, p. 173-174, 178, 186; Romer, 1968, p. 159, 163-164.
*Mammals*: Colbert, 1969, p. 368-369, 454, 457; Dunbar and Waage, 1969, p. 464; Lull, 1908, p. 180; Lull, 1940, p. 569, 615; McGrew, 1937, p. 448; Osborn, 1929, p. 759, 831; Scott, 1937, p. 335, 476; Stirton, 1959, p. 48; Thomson, 1925, p. 60.

nature" (Brouwer, 1967, p. 161; Olson, 1965, p. 100-101, 201-203). Moreover, although there are reasons why transitional sequences between higher taxa are not as frequent as we would like (Brouwer, 1967, p. 160-169; Olson, 1965, p. 118, 184-211; Simpson, 1953, p. 366-376; Simpson, 1960, p. 159-161), nevertheless we can cite some particularly impressive transitional fossils between higher taxa of various ranks. In addition to those mentioned previously as inter-phylum and inter-class transitions, others involve higher taxa of class-group rank (Erben, 1966; Raup & Stanley, 1971, p. 306-307), orders (Easton, 1960, p. 446; Miller, Furnish, & Schindewolf, 1957, p. L22; Teichert, 1964, p. K325), families (Arkell, Kummel, & Wright, 1957, p. L117-119; Brinkmann, 1937; Easton, 1960, p. 425; Flower, 1941, p. 526; Moore, Lalicker, & Fischer, 1952, p. 351), and genera (Arkell, Kummel, & Wright, 1957, p. L116-118; Brinkmann, 1929; Brouwer, 1967, p. 158; Gimbrede, 1962; Newell, 1942, p. 21, 59; Raup & Stanley, 1971, p. 264).

## Evolutionary Implications of Transitional Fossils

Let us consider the implications of an observable sequence of transitional fossils, such as those examples cited above, linking an earlier form (A, in Figure 1) with a later form (I). At a preliminary stage of knowledge, when only the relatively distinct forms A and I are known, it could be thought (as was actually done in the early 1800's) that the earlier form (A) had been instantly created, lived for a time, was then eliminated by some catastrophic environmental event, and after extinction was replaced by special creation of the somewhat similar later form (I). As our knowledge of the paleontologic record begins to increase, we find a third form (such as E, in Figure 1) which is morphologically and chronologically intermediate between A and I. The gap between A and I is thus partly filled and replaced by two narrower gaps, and we must invoke an additional special creation and catastrophic extinction to explain the observed record. Continued collecting uncovers more morphologically and chronologically intermediate specimens (say C and G, and later also B, D, F, and H, in Figure 1); at each step, the new gaps we produce by partly filling existing ones are progressively smaller, and we must invoke ever more instantaneous creations and catastrophic extinctions. It is evident that, when we have accumulated a very large series of transitional fossils grading continuously from A to I (as we often now have in the course of population-oriented paleontologic studies), we must envision a very large number of creations and catastrophes—approaching, in fact, the probable number of reproductive generations involved in the sequence, allowing for the vagaries of the processes of fossilization and study. Invoking progressively more special creations until each generation is interpreted as the result of special creation becomes clearly implausible. Instead, noting that many fossils preserve ordinary reproductive structures, and also that the differences between successive fossil assemblages are of magnitude comparable to those observable between consecutive ancestor-descendent populations in nature today, we are forced to conclude that the entire series represents a chain of reproductive generations, descending one from the other by the usual natural reproductive processes, uninterrupted by any special creative acts from without.

As emphasized above, transitional fossils are known

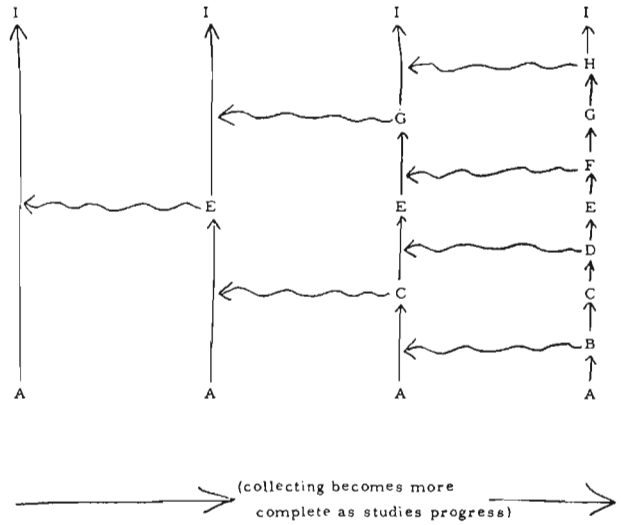


Figure 1. The implications of an observable sequence of transitional fossils, linking an earlier form (A) to a later form (I).

between groups of organisms classified at both low and high taxonomic ranks; i.e., between both low- and high-rank taxa.

Low-rank taxa—the many species known to us—have a real existence in nature, in that they consist of populations or morphologically similar, actually or potentially interbreeding individuals which live during a continuous segment of geologic time. Transitional fossils between morphologically distinct, chronologically successive species require us thus to conclude that a new species results from the operation of natural reproductive processes upon successive generations of a population without the intervention of special creative acts; i.e., through what the scientist terms "evolutionary processes".

On the other hand, higher taxa—those above species-rank, from genera up through phyla—do not have a real existence in nature in quite the same sense that species do. Instead, higher taxa of various ranks are simply the scientist's mental abstractions by which the many species comprising the organic world are grouped according to the various degrees of over-all morphologic similarity displayed. Species which are very similar may be grouped within one genus, while species which have only a little in common may be grouped together only in the same class or phylum. Since higher taxa are no more than aggregations of species, transitional fossils between higher taxa indicate simply that, in time, the same natural ancestor-descendent process producing new species eventually produces a chain of successive and progressively more different species, whose final member will be drastically different in morphology from its initial member and will therefore be classified by taxonomists in a different high-rank taxon. Consequently, the practice has developed among modern taxonomists that higher-rank classifications, which are based initially upon observable degrees of morphologic similarity among species, also should reflect evolutionary ancestor-descendent relationships among those species as much as possible. Moreover, it also is apparent that the amount of morphologic change producable by evolutionary processes is essentially unlimited, given the context of vast eons of geologic time.

As a still broader implication of these considerations, we can define "evolution" as the gradual and permanent change in the form and function of adult living organisms, of successive generations, over a long period of geologic time. Paleontologic evidence (discussed here) has played the critical role in developing this concept, but numerous other lines of evidence also suggest it. The interested reader can explore these in other excellent sources (especially Lull, 1940; Olson, 1965; Simpson, 1953), where he also can learn that the process termed "natural selection"—far from being carelessly equated to evolution as some anti-evolutionists assert—is an important part of the *method* by which evolution is accomplished. Moreover, the range in taxonomic ranks over which transitional fossils are observed (as described above) shows that what some anti-evolutionists label "general" and "special" evolution are merely extreme end-members in the scale of a single natural phenomenon, evolution, and thus usually do not warrant separate consideration.

As defined above, evolution is a scientific (rather than, say, philosophical) concept, and so comments about the nature of science are relevant here.

Using actual practice as the basis for definition, we can define "science" simply as the attempt to understand natural phenomena more completely by means of repeatable or verifiable observations of natural phenomena. (This is broader than the rigid, prediction- or experiment-oriented definitions developed by some philosophers not actively engaged in scientific work.) Also, unlike mathematics or logic, science does not deal in formally rigorous certainties, but instead strives for conclusions which are at best highly probable. Failure to understand this has made extensive, philosophically-based discussions—by anti-evolutionists, among others—irrelevant. Moreover, while the search for ultimate or first causes moves into the realm of metaphysics, discussion of possible proximate or intermediate causes which might be implied by observational evidence clearly falls well within the scope of science.

Still further, we need to realize that there is no fundamental difference between what has been termed "historical science" and "empirical science". The scholar can be relatively certain of only what he is experiencing at the present moment, not of what the objects he is examining imply to him about the past. This is as true for the chemist reading his notebook describing yesterday's experiments and for the historian examining ancient Egyptian records, as it is for the paleontologist viewing the fossils and rock strata which form the pages of a natural textbook. None of these three can be rigorously certain that their world was not instantaneously created minutes ago with all its evidences of apparently longer history (Olson, 1965, p. 49); however, for each, his scholarly interpretations about events before the present moment are much more probable than would be purely conjectural imaginings.

Paleontologists studying sequences of transitional fossils are clearly operating in a scientific manner, because their data can be regenerated by anyone willing to examine the earth's crust independently. As more and more such sequences come to light, considering the processes which formed them becomes essential if we are to understand nature more thoroughly (i.e., still within the scope of science). As discussed above, interpreting these sequences as proximately due to evolutionary processes becomes ever more probable (in fact, overwhelmingly so, agree all who have been directly involved with the evidence), while a *fiat*-creationist interpretation becomes ever less likely. Because of the long time spans involved, we will never be rigorously certain that our view is a wholly accurate reflection of natural reality, but the many transitional fossils known render evolution already so highly probable that presentation of it as scientific fact is quite justified. Finally, as is generally true in the development of science, once a concept has been well documented, it can in turn provide a basis for further work; the concept of evolution has done just this most fruitfully for many areas within the earth and life sciences over the past years.

A few remarks are also appropriate about the theological implications of evolution as demonstrated by sequences of transitional fossils. As the reader may have noted, theological considerations do not enter at all into our demonstration of evolution as a very highly probable scientific conclusion. Consequently, like other scientific conclusions, this one cannot be viewed as inherently either pro- or anti-Christian. However, of course, Christians—especially theologians—will need to integrate evolutionary process into their views as being the proximate means which God uses to create various forms of life, just as He uses other scientifically demonstrable processes to maintain the natural universe.

## Conclusion

In summary, the paleontologic record displays numerous sequences of transitional fossils, oriented appropriately within the independently derivable geochronologic time framework, and morphologically and chronologically connecting earlier species with later species (often so different that the end-members are classified in different high-rank taxa). These sequences quite overwhelmingly support an evolutionary, rather than a *fiat*-creationist, view of the history of life. Consequently, after carefully considering the implications of the fossil record, we must conclude that that record represents the remains of gradually and continuously evolving, ancestor-descendent lineages, uninterrupted by special creative acts, and producing successive different species which eventually become so divergent from the initial form that they constitute new major kinds of organisms.

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## *Moore's Critique of Cuffey's Position*

Several comments must be made in critique of Cuffey's position paper. Within his very first sentence he contributes to confusion of terminology by presenting the alternative: "development or evolution". This suggestion that development, during the life time of an organism, is interchangeable with supposed evolutionary alteration of one kind of organism into another kind of organism is the very confusion that Louis Agassiz and many others in succeeding decades have urged evolutionists to avoid. Development of an individual organism and general evolution are *not* alternative concepts.

And apparently Cuffey has contented himself with consideration of physical evidence from the geological record only; consequently, he has ignored completely the full range of data utilized initially by Charles Darwin as he developed his persuasively expressed case for imagined changes of species over time. (I assume that Cuffey realizes the cogency of my explication of the sheerly circumstantial nature of physical evidence from those areas covered by Darwin.)

Anyway because Cuffey has chosen to concentrate only on the fossil or paleontological evidence, and has given his greatest attention to so-called "transitional fossils", he has limited my task of criticism.

However, before turning to careful examination of his proffered evidence for so-called "transitional fossils", a significant lack of understanding of scientific methodology on Cuffey's part must be made explicit. He fails to comprehend evidently that all empirical work of geologists is confined to what they are able to study in their lifetime. That is, most of the actual empirical work of geologists involves detection of types of rocks, classification of rock types on or near the earth's surface, and examination of material included in rocks (especially sedimentary rocks), which commonly involves study of inclusions (fossils) *interpreted* as parts of and/or impressions of previous living organisms.

Thus his early use of the term "demonstrated" in his second sentence, and again several times in the Introduction plus many other times in his position paper, is ample indication that he does not understand that geologists cannot *demonstrate empirically* anything regarding organic evolution which is supposed to have occurred over time. Geologists can only *interpret* what they find as empirical scientists, as far as the unrepeatable past is concerned, and this fact would seem to be clearly evident from Cuffey's own words before his last introductory paragraph, i. e., "make evolutionary interprepretations ultimately inescapable". Of course his evolutionary *interpretations* are *not* ultimately inescapable.

Hence, in his zeal to present his case for "transitional fossils", as forcefully as he feels he can, Cuffey fails to realize that all conclusions that he offers about "sequences" or "succession" or "series" are plainly *reconstructions* and *extrapolations* of what geologists want to interpret about material found in rocks, *after* they have first accepted evolutionary thinking as a frame of reference. In writing to numerous other geologists about

these concepts, I find that they rather reluctantly admit this point; they come to realize belatedly that the fossil record in no way is sufficient and necessary to establish genetic connections between different kinds of organisms. Absolutely no known genetic lineage is established from any paleontological study, no matter how lengthy the study of the rocks or of the literature about the rocks.

This brings us face to face with another significant shortcoming of the position taken by Cuffey. He does not define "evolution" in his introductory remarks and, when he finally gives attention to such an important point midway in the section before his conclusion, he leaves his readers in utter confusion. Cuffey then defines "evolution" in reference to changes in adult forms through successive generations. Clearly ambiguous, he does not tell his readers that he is only addressing his entire line of discourse *basically* to changes within limits of a kind of organism where generation after generation of the same kind of organism could be extrapolated from the fossil data.

He evidently tries to avoid this restriction on his presentation by referring to "general" and "special" evolution as extremes "in the scale of a single natural phenomenon, evolution, . . ." . But neither he nor any other geologist can show *empirically* that the fossils they find are part of any "natural phenomenon", as far as illustrating any genetic lineage of one kind of organism with another kind of organism.

His attention to supposed "transitional fossils" is where Cuffey becomes involved in a blatant ambiguity. He clearly illustrates this fact in his use of Tables 1 through 5.

All the physical data cited per references included in Table 1 relate solely to supposed changes of "species within the same higher taxon (genus)". So in what way can Cuffey think that these data are at all relevant to the question of explaining change of one kind of organism into another kind of organism? And the same question can be asked with respect to Table 3 wherein he has cited referential materials again of "species within the same higher taxon (genus)".

It may be true that paleontologists have interpreted some fossil evidence to involve changes of species *within* those kinds of organisms he lists, i.e., angiosperms, foraminiferans, brachiopods, gastropods, pelecypods trilobites, and mammals, as far as groups common to both Tables 1 and 3 are concerned. Nevertheless, paleontologists evidently had no difficulty in recognizing these kinds of organisms as *kinds*, and had no basic difficulty in separating the species of one kind of organism from species of another kind of organism.

Thus Table 1 and Table 3 are totally irrelevant to any discussion of supposed changes of one kind of organism into another kind of organism, which is precisely the fundamental meaning of organic evolution, as I have made pointedly specific by affording clear and unambiguous definitions of "general evolution" versus "special evolution". The evident confusion of the terms with which Cuffey seems to be satisfied is quite clear in his fourth section when he refers to "evolutionary variations within species". To juxtapose "evolutionary" and "variation" in this manner partakes explicitly of confusion between supposed changes *across* limits of kinds of organisms (general evolution) and those changes *within* limits of kinds of organisms (genetic variation, or microevolution, if that is what Cuffey means), which can be successfully studied in proper empirical fashion by geneticists.

But to return to Table 2, and then give attention to Tables 4 and 5, which Cuffey refers to at some length in his section on "examples" of so-called "transitional fossils". I again write "so-called" because his referential citations, when checked out carefully, do not afford any evidence of change of one kind of organism into another kind of organism, which is exactly the degree of change to which Cuffey and any paleontologist must address himself, if purporting to supply physical "evidence" for organic evolution, and not just limited changes *within* boundaries of kind. Space limitations prevent complete, item by item analysis, but I will give attention to several representative groups included in these tables.

For instance, in Table 2, Cuffey cites five sources of information about hominid species gradation supposedly "crossing from one higher taxon into another". Accepting the clear fact that a "taxon" is essentially whatever a group of specialists say it is, then I must point out that proposals about hominid relationships by Coon, Howells, Kummel, Le Gros Clark, or Uzzell and Pilbeam are sheerly conjectural and speculative because their work is totally devoid of establishment of any direct genetic lineage. These men have concentrated on *reasoned extrapolations* from the fossil data, and have offered their speculations about supposed hominid changes *after* they have first accepted the thesis of general evolution as I have defined it. And the same comment holds for the speculations of E. C. Olson with respect to supposed reptile to mammal transition included in Table 4.

But most attention should be given to Table 5 because of referential citations pertaining to three supposed vertebrate transitions: a) fish-tetrapod (Crossopterygian-amphibian), b) amphibian-reptile, and c) reptile-mammal (also included in Table 4). (Discussion of supposed vertebrate transitions are always favored by evolutionists.) Here Cuffey, like most other paleontologists, claims that amphibians have "evolved" from fish. However, no one has ever found a single transitional form showing part fins and part feet, though these changes would have involved conceivably a vast multitude of transitional forms.

A certain fish, known as a crossopterygian, is supposed to have "envolved" into a labyrinthodont. Noteworthy is the fact that paleontologists reconstruct the crossopterygian as a fish, equipped with fins, which certainly did not resemble a four-footed animal. The labyrinthodont, on the other hand, had four feet and legs according to paleontological reconstruction, and was obviously an amphibian. No one would confuse it with a fish.

But no one has ever found a single transitional form between them! The *only reasonable scientific conclusion* seems to be that these transitional forms are not found because they never existed.

Paleontologists have supposed that a reptile "evolved" into a bird. Such transition should be traced easily in the fossil record, since forelimbs of the reptile must have changed slowly and gradually into wings of the bird, and reptilian scales must have changed slowly also into feathers. However, no one has ever found a single fossil either with half-way forelimbs and half-way wings, or with half-way scales and half-way feathers. Nor has any other stage between reptile and bird ever been found.

Of course, Cuffey refers to *Archeopteryx* as one of

the "most famous and spectacular transitional fossils known", as is so customary with most paleontologists. However, other evolutionists deny this claim. It is noteworthy that *Archeopteryx* had claw-like appendages on the leading edge of its wings; and, a species of birds living today, the Hoactzin of South America, has such claw-like appendages. Also *Archeopteryx* had teeth, but other extinct birds, unquestionably 100% birds, had teeth. And though *Archeopteryx*, unlike all other birds, had vertebrae extending out along the tail, nevertheless *Archeopteryx* had 100% wings and 100% feathers. Thus it is safe to conclude that *Archeopteryx* was a bird.

*Archeopteryx* was no more a transitional form between reptile and bird than the bat is between mammal and bird. An authority on birds has stated: "The origin of birds is largely a matter of *deduction*. There is *no fossil* of the stages through which the remarkable change from reptile to bird was achieved." (Marshall, A.J., Editor. 1960. Biology and comparative physiology of birds. New York: Academic Press, p. 1) (Emphases added) Now this evolutionist did not say that there are only a few fossils at this supposed transitional stage, but he said there are *no* fossils.

And speaking of bats, I would call attention to the cover photograph of *Science*, December 9, 1966, showing a reconstruction of the bones of what is claimed to be the oldest known bat, and also call attention to comment in the related article that *no fossil related to a bat had ever been found* in the same rocks, or any older rocks than the claimed age of 50 million years for the bat bones. Pictured there was the oldest known bat and it was recognized clearly as 100% bat, the only mammal that flies, which supposedly "evolved" the power of flight over vast lengths of time. Yet no one has ever been able to find a single fossil to document this claim.

With reference to supposed transitional forms, the ability to fly supposedly has "evolved" separately in four different kinds of animals—the insects, flying reptiles (pterosaurs), birds, and bats. If general evolution has really happened, surely we must be able to find some physical evidence in the fossil record, in at least one or two of these cases. But *no* evidence can be found for the imagined evolutionary origin of the ability to fly.

Paleontologist Olson has admitted that as far as flight is concerned there are some very big gaps in the record (The evolution of life, 1966. New York: The New American Library, p. 180). He holds that there is almost no information about the history of the origin of flight in insects. He stated that there is absolutely no sign of intermediate stages for the pterosaurs, or flying reptiles. And referring to the alleged reptile-like features of *Archeopteryx*, he had to admit that *Archeopteryx* was definitely a bird with no evidence of presumed evolutionary ancestors. Finally he stated that the first evidence of flight in mammals is in *fully developed bats*. Therefore, the fossil record is *devoid* of any physical evidence for any imagined evolutionary origin of flight. There are *no* transitional forms! (See also Gish, Duane T. 1972. Evolution: the fossils say *no!* San Diego: Institute for Creation Research, 2716 Madison Avenue.)

A further indication of Cuffey's inclination toward lack of precision in definition of terms he uses, beyond his perpetrated confusion re the term "evolution", is found after his definition of "science" in his words, "there is no fundamental difference between what has been termed 'historical science' and 'empirical science' ". This is completely false. He is confused when he compares the chemist, who actually wrote the notebook he later reads, and the work of the paleontologist, who never has seen the rocks formed or the fossils made that he purports to interpret as bases for general evolution.

Even examination of ancient Egyptian records ranks in a separate category from the "paleontologist viewing the fossils and rock strata", because the former are the products of human effort wherein some Egyptian reported what was actually seen or known on a first-person basis. The paleontologist has *no* such first-person experience with rocks or fossils. Contrary to assertions by Cuffey, "interpretations about events before the present moment", i.e., formation of rock strata and fossilization of organisms, are *nothing more than* "purely conjectural imaginings", to use his own words.

Evidently Cuffey has been weaving *imagined narratives* about fossils and rock strata for so long, as have most paleontologists ever since Charles Lyell, a lawyer, made the practice acceptable to the intelligentsia, that Cuffey and his colleagues have not come to realize, in any explicit manner, the fact that the whole field of "historical" geology involves a maze of imaginative, speculative narratives as extensive *extrapolations* into the past. Indisputably, paleontologists are *limited only* to observational work with rocks, strata, impressions, and inclusions, and such observational work is the extent of their actual *empirical* scientific work. They *cannot repeat* events involving such objects. They *cannot be scientific* by trustworthy, testable, repeatable methods beyond straight forward observation of rocks, strata, impressions, and inclusions. Therefore, *all* their thoughts about supposed transitional forms, and about imagined past events, are of no value other than as imagined formulations based on *circumstantially* arranged objects.

When evolutionists, and others probably including Cuffey, refer to such forms as *Peripatus* and *Neopilina* as possible transitional forms, or to *Jamoytius, Archeopteryx, Seymouria,* and *Tupaia,* as intermediate or linking forms, they merely count on circumstantial similarities which are proposed by the paleontologists *in their opinion* as evidence to support general evolution. But opinion and speculative, circumstantial interpretations are exactly what the empirical scientist seeks to *avoid* in *preference* to conclusive genetic evidence.

The only true transitional form that could be accepted, it seems to me, is that form demonstrated empirically, conclusively as genetically connected to two major kinds of organisms. Such conclusive evidence would be obtainable only through cross breeding experiments subject to repeatable observations.

Hence, nothing is gained, from all of Cuffey's careful compilation of referential citations, that counts as physical evidence for imagined general evolutionary changes of the degree that might have involved changes from one type, form, or kind of organism into another type, form, or kind of organism. He has provided *only* data regarding changes supposedly within kinds which are essentially to be considered as no more than genetic variational changes. Basically, *all* of his referential citations relate to physical evidence that can be utilized better to support the concept of "fixity of kinds". He has failed to provide any true transitional forms between or across kinds of organisms.

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