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

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JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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NEW EDITOR FOR THE JOURNAL

Beginning with the March 1969 issue, the *Journal of the American Scientific Affiliation* will be edited by Richard H. Bube, who retires from the presidency of the Affiliation at the end of this year. Dr. Bube has demonstrated his aptitude for writing and editing not only by his presidential letter and articles in the *Journal* but also by his book *A Textbook of Christian Doctrine*, published by Moody Press in 1955, and his recent editing of the volume on *The Encounter Between Science and Christianity* with the cooperation of other scientists whose writings were printed by Eerdmans. Numerous technical papers have risen from his research in solid state physics as well as the Wiley text *Photoconductivity of Solids*, and a forthcoming volume by McGraw-Hill on *Electronic Properties of Crystalline Solids*.

Dr. Bube is Professor of Materials Science and Electrical Engineering at Stanford University where he was host to the ASA convention in 1967.

Dr. Bube not only stands tall in his own person but also in his Presbyterian church and in other evangelical endeavors such as Inter-Varsity and Evangelical Theological Society.

The present editors hand the *Journal* to Richard Bube with confidence in his own ability and in that of the ones he chooses to cooperate with him in this valuable contribution of keeping the Christian faith clear and forceful in the modern world.

THE SCIENTIFIC REVOLUTION OF THE SIXTEENTH AND SEVENTEENTH CENTURIES

Implications for the Modern Technological Crisis

CHARLES E. HUMMEL*

The twentieth century has witnessed unprecedented prosperity for much of the western world. The magnificent achievements of the natural sciences have released us from the ravages of many diseases and much drudgery in our daily work. They promise indefinite progress in unlocking nature's secrets, from sub-atomic entities to the vast reaches of interstellar space. Yet these very achievements have brought us to a technological crisis of terrifying proportions which threatens mankind's very existence.

Never before has our capacity for destruction been so great. The same genius which produces a delicate Surveyor spacecraft to land on the moon and radio back pictures of its surface also deploys a thousand nuclear missiles poised to obliterate a hundred million people in one strike. Our vast industrial machine works its destructive effects, although more gradually, on our environment through increasing air and water pollution. Even more subtle and dangerous in the long run is the technological environment we are producing to subordinate human values to efficiency, to make man the servant of his machines, even in our educational institutions.

We boast of our scientific progress, yet for most people life today appears more perplexing and beset with problems than ever before. Modern literature and art forms reflect this sense of frustration—and our poets and novelists are always the most perceptive observers of the human situation. Ironically, affluence is matched by anxiety as our technological skills have reached peak efficiency in a climate of apparent meaninglessness, moral irresponsibility, and impersonal manipulation.

Protest against this plight has become commonplace, but where do we turn for a sense of direction and the moral dynamic to pursue the right path? How can we enjoy the achievements of science and technology without their destroying our natural environment and ourselves through depersonalization even if we escape nuclear annihilation? Surely the first step is to assess the nature of the scientific enterprise to understand its objectives, limitations, and means of control. In order to do this we shall survey its historical development, particularly the scientific revolution of the sixteenth and seventeenth centuries. Professor George Santayana of Harvard once asserted that he who does not learn from history is doomed to repeat its errors. So we shall briefly review the beginnings of science in early Greek thought, note its marriage with theology in the thirteenth century, and then trace the development of the modern scientific method as a discipline distinct from philosophy and theology.

In doing so we shall see that far from being the enemy of science, Christianity provided the home in which it matured. It was not until the nineteenth century that Western culture discarded traditional Christian morality as a base and turned to science for its guidance. Herein lies the dilemma of our own century. Having freed itself from philosophy and religion, science was then made to cope with the problems of meaning, value, and purpose—questions alien to its nature. This misuse of science by our culture has contributed to the technological crisis which Wilbur Ferry describes so perceptively.[1] "Here is where all the trouble begins—in the American confidence that technology is ultimately the medicine for all ills. . . . Technology is the American theology, promising salvation by material works."

The following historical sketch will provide the background for this problem. As we understand the nature and purpose of the modern scientific approach to nature, we shall appreciate both its value and its inherent limitations. Then we shall see clearly the role of science in contemporary society and the need for another base for the moral guidelines it requires to be a helpful servant rather than an overbearing master.

Early Greek Science

From the dawn of civilization men have tried to understand the natural world of their physical and biological environment. The Egyptians formulated mathematical rules for land measurements while the Babylonians developed an interest in observing the movements of the heavenly bodies. But the Greeks hold undisputed title as the original thinkers and scientists of

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Europe. From the outset Greek philosophy was bound up with mathematics and pursued knowledge for its own sake in the spirit of free inquiry. The earliest Ionian philosopher, Thales of Miletus (640-550 B.C.), was a mixture of practical scientist and philosopher.[2] The Milesian School of philosophy was the first to assume that the whole universe is natural and can potentially be explained by ordinary knowledge and rational thought. This assumption also undergirds the modern scientific enterprise.

The following two centuries produced a score of able philosophers who dealt with the problems of knowledge, substance, being, and change in a variety of ways. The most important for the history of science was Aristotle (384-322 B.C.), the greatest collector and organizer of knowledge in the ancient world.[3] He produced an encyclopedia of information within a system of thought that captured the mind of the western world for almost 2000 years.

Aristotle endeavored to complete the unity of Being by weaving all the separate things and qualities of the world into one unified fabric of thought. He arranged them in an ascending hierarchy of values from formless matter (earth) at the bottom to matterless pure form at the top. He enumerated ten categories of the universal properties of things, for example, *what* (substance), *how large* (quantity), *where* (place), *when* (time), etc. In addition, he advocated the idea of purpose in nature according to which it is gradually progressing toward the unity of all things. Aristotle also distinguished four kinds of causes: (1) *material*: matter—materials for building; (2) *formal*: idea—blueprint for the building; (3) *efficient*: man—the builder; (4) *final*: purpose—a dwelling.

What then is the task of the scientist according to Aristotle? It is mainly to range over the physical world and put things into their proper place in this comprehensive system according to their value and purpose. Since quantity is only one of the ten categories, Aristotelian science is more a project of classification than measurement. Scientific description identified an object's universal properties and causes in order to assign its value and place in the regularly ascending order of nature. And since through action and reaction the world is becoming a unity governed by a regular process toward an end, the scientist is concerned not only with the efficient cause of phenomena (the interest of modern science), but also with the final cause or goal. It is evident from the foregoing that Greek science included what we call philosophy, since it dealt with natural phenomena in terms of ultimate questions of value and purpose. Hence the term "natural philosophy" employed to describe this discipline.

Aristotle's system of thought stimulated scientific investigation during the following centuries. Eventually the intellectual center of the western world shifted from Athens to Alexandria, where Euclid, Hipparchus, Archimedes, and Ptolemy did their research while the Greek Empire disintegrated. Hipparchus and Ptolemy developed their astronomy within Aristotle's framework which placed the earth as the center of the universe around which the sun, moon, and planets revolve.

The Romans seemed to have valued science mainly to accomplish practical results in architecture, engineering, agriculture, and medicine. Since the Romans utilized the stream of knowledge without replenishing its source, in a few generations it ran dry. Nevertheless, Greek natural philosophy stayed alive in the synthesis of Jewish, Greek and Christian thought of the early Church Fathers. During the next five hundred years in the political, economic and social collapse of the Dark Ages, the light of secular learning flickered near extinction. But it glimmered in the treatises of Boethius, a Roman noble and Christian martyr, which served as school books of the period. Through them the light of Aristotle illuminated the medieval mind of Western Europe.

Science and Theology

Between 1200 and 1225 A.D. the complete works of Aristotle were recovered and translated into Latin. They opened up a new world to the medieval mind. During this century Thomas Aquinas (1225-1274 A.D.) synthesized Aristotelian natural philosophy with Christian theology.[4] In his great works, *Summa Philosophica contra Gentiles* and *Summa Theologica,* Aquinas shows that philosophy and theology, human reason and divine revelation, must be compatible. While he thought the existence of God could be demonstrated by reason, the doctrines of the Trinity and Incarnation, for example, are received by faith. Aquinas developed his system within Aristotle's philosophical framework in which logic professes to give rigorous proof from accepted premises. This method supported the idea of knowledge derived by reason from intuitive axioms and ecclesiastical authority. Such a method is hardly conducive to the free investigation of nature![5]

Scholastic philosophy reached its greatest strength under Aquinas; its hold was both intense and prolonged. Now that science, philosophy and theology were welded into one system, any questioning of Aristotle could be construed as an attack upon the Church. This marriage of Aristotelian natural philosophy and Christian theology, harmonious as it was at the start, set the stage for the domestic quarrels of the sixteenth and seventeenth centuries and produced many problem children who reacted strongly against their home environment. It also demonstrated that a theology which marries the philosophy of one generation is likely to become a widow in the next.

By the end of the thirteenth century attacks against scholasticism gained momentum. William of Occam (d. 1347) advocated the divorce of theology from natural philosophy, leaving the latter to roam freely in search of nature's secrets. Yet while the scholastics resisted original experimentation, they kept alive the Greek attitude of logical analysis and intellectual curiosity. Between the fourteenth and sixteenth centuries the foundations of Aristotelian philosophy developed cracks

which began to widen. At first the investigators, working within the accepted framework, intended simply to patch these fissures. But their experiments and thinking led to the eventual disintegration of the Aristotelian edifice. The new scientists used the mental tools of Aristotle to undermine his system; once freed from his authority, however, they were able to follow his magnificent example in breaking new intellectual ground.

The Middle Ages, having provided the seed-bed for the growth of modern thought, gave way to the Renaissance and Reformation. When Constantinople fell to the Turks in 1453, many competent teachers fled and brought their manuscripts with them. Humanism, the study of these "humane letters," spread throughout Europe. Portuguese explorers reached India around the Cape of Good Hope and Columbus discovered the New World in the 1490's. New information came back as exploration and trade increased. Like the golden age of Greek thought 1700 years earlier, it was a period of geographic and economic expansion. The sixteenth century was also a time of political and religious revolution. The Reformation started in 1517 when Martin Luther nailed his 95 theses to the church door in Wittenburg and soon spread through northern Europe. Old centers of authority were breaking up as a new world was opening. In this context of the Renaissance and the disruption of Western Christianity, the scientific revolution took place.

The Scientific Revolution

Every revolution has both an extended period of unrest before the opening shots are fired and subsequent skirmishes after the decisive battle has been fought. We have seen that two centuries of Renaissance and Reformation prepared the climate for the scientific revolution which began with Copernicus and ended with Newton. Throughout this 150-year period the controversy concerned the central problem of motion which had baffled many of the finest minds for two millenia.[6] According to Aristotle, all bodies tend naturally to travel toward the center of the universe, which he understood to be the earth. Other motion, considered "unnatural," is caused by a continuing force necessary to sustain it; hence the idea of an original Prime Mover. During the sixteenth and seventeenth centuries, however, scientific research radically altered this concept of motion and the nature of scientific explanation. While many men of genius contributed to this great complex movement, Copernicus, Kepler, Galileo, and Newton made crucial discoveries which revolutionized man's understanding of his universe and laid the foundations of modern science. Our brief examination of their work will provide an historical basis for understanding the critical issues confronting science, theology and philosophy today.

Nicolaus Koppernigk[7] (1473-1543) was born of a Polish father and German mother who Latinized his name as Copernicus. In 1496 he went to Italy as a student of mathematics and astronomy. At that time the accepted Ptolemaic theory considered the sun and planets to revolve around the earth. This system required 80 wheels (cycles and epicycles) to describe the planetary motions since their orbits were assumed to be circular.[8] As a keen mathematician, Copernicus had difficulty accepting such a complicated arrangement.[9] Using Ptolemy's own principle of the simplest geometrical scheme, he tried to simplify the diagram. By placing the sun in the center, with the planets including the earth revolving around it, Copernicus reduced the number of wheels to 34. When Pope Clement VII heard about this work, he requested the astronomer, a canon of the Catholic Church, to publish it in full. In 1543 Copernicus finally completed his book *Concerning the Revolutions of the Celestial Spheres* which he dedicated to Pope Paul III.

This new theory, going against 2000 years of astronomical tradition, made a major break with the entire system of Aristotle for whom the earth was the center of the scientific, philosophical and religious universe. Copernicus was not a great observer of nature nor did he work with data unknown to his predecessors. His great achievement was to arrange the pieces of the puzzle already at hand into a different picture, one with greater mathematical economy and symmetry.[10] As a geometer, he was convinced that the key to the universe is numerical so that what is mathematically true is really true in astronomy. He held to his theory even though he could not adequately answer the objections it raised; significantly almost all the scholars who supported it during the rest of the sixteenth century were mathematicians. Copernicus both closes an old epoch and opens a new one. The importance of his influence lies not so much in the actual system he produced as the stimulus he gave to other men. Furthermore, his interpretation of the data marked a significant step away from a common sense understanding of nature toward the abstract description of reality so characteristic of modern science. Thus while our eyes tell us that the sun moves, mathematics assures us that it is really the earth which moves around the sun.

Johannes Kepler (1571-1630) formed a link between the old and new eras. A Protestant, he studied at Tübingen where he became convinced that the Copernican hypothesis was correct. His contribution to mathematics, which prepared the way for the calculus of Newton and Leibnitz, alone would have insured his fame. In 1600 Kepler became the assistant to Tycho Brahe of Copenhagen, the greatest observational astronomer since Hipparchus. A year later Brahe's sudden death left his "chaos of data" to which Kepler added mathematical genius. Convinced that God had created the world in accordance with the principle of perfect numbers, he passionately sought to discover the mathematical harmonies of nature. Kepler combined this approach with the insistence that every hypothesis be exactly verified through observation.

Kepler approached the immense collection of observations with the Aristotelian conviction which had gripped the astronomical mind for almost 2000 years:

planets must move in perfect circles. But this theory would not fit the data. After laboriously trying other hypotheses, Kepler finally demonstrated Mars' orbit to be an ellipse.[11] This discovery led to the first of his three planetary laws which summarized a vast amount of data and to this day remain an elegant statement of mathematical truth. It also made another radical break in Aristotle's system of natural philosophy. Kepler interpreted causality in terms of mathematical simplicity and harmony. This harmony, discoverable from the observed facts, is sufficient scientific explanation; the idea of a final cause involving the purpose of the phenomenon is superfluous. Kepler characterized his research as "thinking God's thoughts after Him" as a mystical urge impelled this great scientist to reduce the universe to mechanical law in order to show God's consistency.

Galileo Galilei (1564-1642), born at Pisa, entered the university and became professor of mathematics at the age of twenty-five. While his astronomical observation with the newly invented telescope confirmed the Copernican hypothesis, Galileo turned his attention to the motions of smaller bodies in daily experience. His mathematical genius gave birth to the new science of terrestrial dynamics.

Galileo set out to solve the problem of acceleration by exact mathematical description. Abandoning the idea of final causality, the *ultimate why,* he concentrated on the *immediate how* as the principle of scientific explanation. Galileo had no confidence in observation he could not explain theoretically; the book of nature is written in the language of mathematics. After thirty-four years of experimentation with bodies rolling down an inclined plane, Galileo finally reversed Aristotle's teaching that heavier objects fall faster and formulated his law that the distance any body falls increases as the square of the time. He also overturned Aristotle by discovering that not motion itself, but a change in motion requires a force.

For a while Galileo had the support of high church leaders in Rome. But eventually the implications of his research ran completely counter to his scientific Aristotelian colleagues at the University of Padua who had a vested interest in the status quo. Galileo published his ideas in the Italian vernacular in *The Two Principal World Systems,* writing remarkable for its polemical scorn and literary skill. These controversial dialogues were used by his scientific opponents to bring Galileo before the Inquisition which condemned him to prison, although Pope Urban remitted the sentence. Galileo is often considered the father of modern scientific method because of his combined use of mathematical analysis and experimental data.

Galileo's clash with the Church still ranks for many as the epitome of science's fight for freedom from the toils of religion. He is pictured as a brave martyr suffering the persecution of religious dogmatism. But this version, which enjoys widespread popularity, is actually a rationalist myth which grew up in the last century. Historical research has shown that Galileo's conflict was not with the Biblical revelation but with Aristotelian natural philosophy defended by scholasticism. Both he and his adversaries were in the Roman Catholic Church which had experienced much greater controversy in the Reformation. Further, Galileo and his opponents were scientists in the universities of their day, and every generation has witnessed conflict among scientists tinged with elements of pride, ambition and prejudice common to man. Far from being a simple struggle of science against Christianity, it was a revolt of the new scientists against the old Aristotelian system synthesized with scholastic theology. Proponents of the latter used the authority of the Church in an attempt to maintain the *status quo* and their own positions of power. While the Inquisition's action was deplorable, Whitehead reminds us, "In a generation which saw the Thirty Years' War and remembered Alva in the Netherlands, the worst that happened to men of science was that Galileo suffered an honourable detention and a mild reproof before dying peacefully in his bed."[12] We should also note that Galileo's conflict with religious authority was not typical of Europe. In England, for example, there was no such struggle. Francis Bacon was Lord Keeper of the Great Seal to Queen Elizabeth when he published his *Novum Organum* in 1620, while at the end of the century Queen Anne knighted Isaac Newton and appointed him Master of the Mint.

Following Galileo other important discoveries prepared the way for the final solution of the problem of motion. By the 1660's the harvest was ripe, but it required an outstanding genius to reap it. Isaac Newton (1642-1727) proved to be that genius. He studied at Cambridge University where he became a Fellow in 1665. A superb mathematician, Newton assigned mathematics the central place in natural science but with a deep appreciation of the empirical and experimental. In 1665-66 he began to think about the earth's gravity extending as far as the moon and providing the force necessary to keep the moon from moving away in a straight line. He discovered that the planets observe Kepler's three laws if they are drawn toward the sun by a force inversely proportional to the square of their distance from the sun. Comparing a stone whirling in a sling and the moon revolving around the earth, Newton found the two motions explainable by the same formula. His law of gravitation which reduced the major phenomena of the universe to a single mathematical statement ranks as one of the greatest achievements of the human mind. The whole intricate motion of the solar system could now be worked out from the one assumption that the attraction between any two bodies is proportional to the product of their masses and inversely proportional to the square of the distance between them. Dissastisfied with certain points, Newton put away his work for two decades. In 1687 he published refined calculations in his epochal *Principia Mathematica* which presented in his three laws of motion the solution to a problem that had challenged the best minds for 2000 years.

Newton never considered his scientific research and discoveries to be at odds with the Biblical revelation and his Christian faith. He wrote almost as many theological treatises as scientific classics, never doubting God's existence and control over nature. Although the scientific and religious are fundamentally different intepretations of the universe, Newton held that in the last analysis the scientist and his work are dependent upon God.

Newton's research culminated the scientific revolution of the sixteenth and seventeenth centuries which provided the alternative scientific system to Aristotle and laid the foundation for modern science. From it emerged the concept of scientific explanation of natural phenomena free from philosophical and religious considerations. While the struggle often pitted new ideas against philosophical and religious dogmatism, it was not the simple battle between Christianity and science so often pictured. Rather it was the new men of science revolting against the authority of Aristotelian natural philosophy welded to scholastic theology. While medieval thought obstructed the new science, it also provided the context which made modern science possible. Professor A. N. Whitehead observes that there can be no living science as we know it without a widespread conviction in the existence of an *Order of Nature* which must permeate the general educated public. While he pays tribute to Greek philosophy and Roman law, he concludes that this "inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner, exemplifying general principles" came from "the medieval insistence on the rationality of God, conceived as with the personal energy of Jehovah and with the rationality of a Greek philosopher."[13]

It is a fact of history that the modern scientific movement developed in a civilization stamped by the Biblical revelation of a God who is personal, rational and unchanging. Copernicus, Kepler, Galileo and Newton worked within the thought structure of an orderly world produced by this God. Only later, under the influence of rationalistic and materialistic philosophy in the eighteenth and nineteenth centuries, was modern science largely cut off from its Christian heritage and made to appear in conflict with Christianity.

The nineteenth century witnessed the development of geology and biology which opened new vistas of the earth's age and development. It also produced the great conflict over the evolutionary theory proposed by Charles Darwin, a significant episode in the relationship between science and Christianity of current interest but beyond the scope of the present paper .The twentieth century has witnessed its own scientific revolution in which the theory of relativity and quantum mechanics have overturned Newtonian mechanics as a comprehensive system for interpreting all natural phenomena, particularly at the sub-atomic level. But these more recent developments have extended rather than altered the basic approach to nature which we call the modern scientific method.

Modern Scientific Method

This brief study of the work of these four great thinkers of the sixteenth and seventeenth centuries has identified the essential characteristics of the method utilized by the natural sciences. Based on conceptual logic and the fit between theory and data, this method employs mathematics as its prime tool. Today's scientist measures and quantifies in search of a mathematical explanation of phenomena which correlates them and makes prediction possible. Copernicus used the principle of economy to produce a simpler explanation of the celestial data. In doing so, he moved from the realm of common sense observation (I see the sun setting) to abstract explanation (the earth rotates so that the sun only appears to set). Kepler insisted that a scientific theory be tested by the data. He interpreted causality in terms of mathematical harmony, discoverable from the observed facts and sufficient as scientific explanation. Galileo also abandoned the idea of a final cause, the *ultimate why* of the phenomena, and concentrated on the immediate *how* as the principle of scientific explanation. As a corollary to Kepler, he had no confidence in observed data he could not explain theoretically. Newton also assigned mathematics the central place in natural science but with a corresponding deep appreciation of experimental data and the empirical approach to phenomena. Combining methods of mathematical analysis and experiment, the scientific method as developed by Galileo isolates the phenomena to be studied, produces a mathematical analysis or demonstration, and verifies it by experiments. Newton followed essentially the same procedure, beginning and ending with experimentation. His scientific method oscillates between mathematical theory and empirical data.

How are scientific principles discovered? While this question is complex, we may say that it is neither by pure induction, which shows that something *actually is,* nor by deduction, which proves that something *must be.* Rather it is by retroduction which suggests that something *may be.*[14] In his interaction with the data, the scientist gains an insight; he grasps a pattern which may give the data structure and intelligibility. He tests it, modifies it, and finally shows that it explains the data. He now has a theory or hypothesis.

We thus see three major characteristics of the modern scientific approach to nature. First, its main tool is mathematics which produces an abstract explanation of reality often at odds with a common sense view. Second, it has divorced itself from philosophy and theology as disciplines. Third, as a consequence, it represents only a partial view of reality, however effective this view has proved for its own purposes. Let us examine each of these facets briefly.

First, while the scientific method endeavors to explain the experience of our senses in the world, it does so in abstract terms which move away from common sense explanation. We saw this in the Copernican hypothesis that the earth (which appears stationary) moves around the sun (which we see moving). While the nineteenth century gloried in mechanical models

to depict natural forces, modern scientific theory discourages visualization of phenomena such as electrons. Seeing is no longer believing. Viewing a blazing sunset, we see a red ball slowly disappearing below the horizon. But on three counts modern science tells us we are wrong. Not the sun but the earth is moving; the sun's light is not really red but white; furthermore, the sun is not actually at the horizon but it is already below it since the light we see left the sun about eight minutes ago. And we are quite happy to believe this explanation which contradicts our senses!

Second, we must recognize that science, where it is true to its historical genius, no longer concerns itself directly with questions of philosophy and theology. Not for a moment, however, does this mean that science has no philosophical or religious presuppositions. Like all disciplines, it must start with assumptions. Several basic presuppositions are the reality of the natural world, its rationality or consistency, and its understandability—at least in part. The validity of sense perception (in reading a gauge, for example) and the basic rules of logic are also assumed. Furthermore, one ethical or moral presupposition is also held to be essential: honesty in reporting the experimental data. Nevertheless, the scientific method doesn't deal with or produce answers to questions of purpose, value and meaning. To illustrate this point Margenau observes: "Science will tell us what things are real but will refuse to say what is *reality*. . . . One can practice science without ever using the world *real;* indeed, as a rule, the less said about reality, the better the quality of the science."[15] Margenau affirms the presence of metaphysical elements and assumptions in any science; yet competent physicists can hold widely differing philosophical and religious positions.

Third, as a consequence, the scientific approach to nature provides only a partial view of reality, contrary to the popular idea propounded by many scientists that it is the best or only valid explanation of the natural world. Science looks at nature's forces and phenomena through a mathematical lens and so sees them in terms of formulas. But we have other equally valid perspectives on reality. Let us consider four men standing on a hilltop surveying the countryside bathed in late afternoon sunlight. All are *looking at* the same scene, but each *sees* something different and describes it in his own medium. Physicist Einstein describes the relative motion of sun and earth scientifically in mathematical formulas. Bethoven, the musician, writes his *Pastoral Symphony*. Artist Gauguin paints the glories of the sunset in richly varied hues, while the Psalmist writes, "The heavens declare the glory of God, and the firmament showeth his handiwork." Here we see four ways of describing the same scene, each magnificent and meaningful in its own terms from its peculiar perspective, all enriching our understanding of the natural world. While Einstein's formulas are required to land a man on the moon, would we not prefer a Gauguin over the mantlepiece in our living room?

Conclusion

Our brief historical survey has shown the interrelationships of science, philosophy and theology in crucial periods of western civilization. During the scientific revolution of the sixteenth and seventeenth centuries, science freed itself from the philosophy with which it had been wedded since Aristotle and from the more recent alliance forged by Aquinas. Nevertheless, its pioneers such as Copernicus, Kepler, Galileo and Newton worked within the structure of a Christian world-and-life view. But the very success of modern science in explaining natural phenomena led to its deification in the nineteenth century. Scientism has become a modern religion whose devotees claim the potential to solve all human problems, given enough time. Yet insofar as science attempts to answer ultimate questions of meaning, value and purpose (the domain of theology and philosophy), it proves untrue to its genius and heritage.

As we face the pressing problems of our age, let us fully value the scientific method for what it can produce. But we must recognize that as a partial view of reality science by its very nature cannot solve our deepest human problem. Its results must be guided by an ethic and morality whose source is elsewhere. Since the popular mind is slow to relinquish myths, we must constantly reaffirm that science can never be the guide to the use of science and technology.

The scientific method through measurement and mathematical analysis attempts to explain the forces of our natural world. Science develops theories or laws which represent our best understanding at present and are always subject to revision. Far from being comprehensive and absolute, these theories are both partial and temporary. They serve as effective tools, always in need of sharpening, which may be used for good or evil. The glory of science lies in its constant pilgrimage, traveling but never arriving. Karl Popper writes, "Science never pursues the illusory aim of making its answers final, or even probable. Its advance is, rather, towards the infinite yet attainable aim of ever discovering new, deeper, and more general problems, and of subjecting its ever tentative answers to ever renewed and ever more rigorous tests."[16]

Science gives us atomic power; do we use it to generate electricity or annihilate our fellow men? Modern technology can land a man on the moon; but should these billions of dollars be spent instead to relieve human misery in our great cities or designing a fume-free car? The automobiles we produce by the million pollute our air while industrial plants pollute both air and water. We can produce the SST but is the noise cost to millions of people worth the price?

Clearly science and technology must be guided and controlled by human values. Thus Ferry argues: "There is a growing list of things we *can* do that we *must not* do. My view is that toxic and tonic potentialities are mingled in technology and that our most challenging task is to sort them out. . . . What is needed is a firm grasp on the technology itself, and an equally clear conviction of the primacy of men, women and

children in all our calculations."[17]

Thus man must look beyond modern scientific method for his ethical and moral guidelines, for answers to his basic questions regarding values and purpose in life. Chemistry depicts man as a complex of compounds and biology describes him as an animal organism. But the Bible represents man uniquely created in the image of God, that image defaced through sin but restorable in Jesus Christ. The Christian experiences this reality and from it gains the perspective to use the results of science for the glory of God and the good of his fellow men. Christian men of science and technology thus have the insight and moral responsibility, both professionally and as citizens, to work for the primacy of human values so that science can indeed be a good servant rather than the power that will eventually destroy us.

NOTES

1. Wilbur H. Ferry, "Must We Rewrite the Constitution," *Saturday Review,* March 2, 1968, p. 50. Ferry's analysis is perceptive and his title dramatizes the magnitude of the crisis, although his solution might well create more problems than it solves.
2. William C. Dampier, *A History of Science,* (Cambridge: The University Press; Fourth Edition, 1961), p. 14,ff. This excellent volume relates the history of science to philosophy and religion. It describes the work of the scientists dealt with later in this paper.
3. Frederick Copleston, S. J., *A History of Philosophy, Volume I,* 1961, (London: Burns and Oates; Seven Volumes), p. 266,ff. This comprehensive survey is both lucid and thorough.
4. Copleston, *op. cit.,* Volume II, 1964, p. 302,ff. See also Dampier, *op. cit.,* p. 85,ff.
5. Alan Richardson, *The Bible in the Age of Science,* (London: SCM Press, 1961), p. 11,ff. This first chapter presents a brief and readable account of the scientific revolution.
6. H. Butterfield, *The Origins of Modern Science,* 1300-1800, (London: G. Bell and Sons, 1962), Chapter One describes the problem of motion at the outset of the scientific revolution and its place in this great period of discovery.
7. Dampier, *op. cit.,* p. 109,ff.
8. While the planetary orbits are ellipses, they can be represented as circular by this much more complicated arrangement.
9. Butterfield, *op. cit.,* Chapter Two. Here is a fascinating account of the way in which Copernicus came to see the same data in a radically new pattern or model.
10. Edwin A. Burtt, *The Metaphysical Foundations of Modern Physical Science,* (London: Routledge and Kegan Paul, 1932), p. 35. Chapter II: *Copernicus and Kepler* demonstrates the role of mathematics and the emergence of the new metaphysics and scientific method.
11. Norwood R. Hanson, *Patterns of Discovery,* (Cambridge: The University Press, 1961), p. 72,ff. This detailed description of Kepler's calculations demonstrates scientific discovery by "retroduction" rather than by simple deduction or induction.
12. Alfred N. Whitehead, *Science and the Modern World,* (New York: The New American Library, 1925), p. 2.
13. *Ibid.,* p. 5.
14. Hanson *op. cit.,* p. 85. Hanson traces this concept of "abduction" or "retroduction" to Aristotle and quotes Peirce: "Deduction proves that something *must* be; Induction shows that something *actually is* operative; Abduction merely suggests that something may be." See also p. 216,ff.
15. Henry Margenau, *The Nature of Physical Reality,* (New York: McGraw Hill, 1950), p. 12.
16. Karl R. Popper, *The Logic of Scientific Discovery,* (New York: Science Editions, 1961), p. 281.
17. Ferry, *op. cit.,* pp. 50,52.

AMERICAN CULTURE AND DRUG USE

GEORGE J. JENNINGS*

Abstract: The use of drugs to produce temporal euphoric states has a long history among many different cultures. Various mind-altering drugs are increasingly used by Americans with the greatest increment in use among middle class youths in high schools and colleges. The motivations for ingesting potentially dangerous drugs are complex although initial efforts have been made to identify and analyze why people are susceptible to using drugs considered harmful. Undoubtedly the motivations are psychological, sociological, and anthropological with resultant habituation sometimes becoming physiological. The effort in this paper is to employ the culture concept as defined in anthropology to suggest several causal factors such as family disintegration and religious ambiguity.

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Psychedelic drug use and consequences are common topics in the news media for the use is increasingly a disturbing feature in contemporary American culture but the phenomenon is neither novel in the twentieth century nor limited to American life (Walton, 1938; Masters and Houston, 1966). Evidently mind-changing drugs have been known and used since antiquity with both primitive and civilized man seeking visionary experiences from plants worshipped as deities who endowed the users with supernatural powers. Frequently the so-called psychedelic drug-producing plants have been associated with magico-religious cults wherein the leaders, shamans and priests, achieved ecstatic states with accompanying charisma by consuming the "visionary vegetables."

The Chinese emperor Shen Neng mentions usage of the hemp plant (*Cannabis indica* or *Cannabis sativa*) as early as 2737 B.C. Eight centuries before Christ, the Assyrians used a hemp derivative such as hashish or marijuana and three centuries later the Scythians sought drug-induced experiences from the same sources. India has used hemp derivatives to produce visions and heightened concentration, that is, a hallucinogenic state, for hundreds of years as an aid to spiritual attainment by the cults of holy men. Drugs continue to be used widely in the Orient to achieve mystical states and thus provide escape from intolerable reality by those who lack contemplative dedication and patient concentration essential to successful yoga. In Islamic cultures where alcoholic beverages are prohibited among the faithful, the widespread use of hashish offers relief and escape even though its use is at the expense of the mental health of some users. Hemp use is common among Negro cultures in Africa with reports of dire consequences where, apart from its provision of supernatural powers to witch doctors, its effects among the native masses range from intoxicated stupor to orgiastic frenzy.

Pre-Columbian Mexico had a number of plants containing psychoactive agents. After conquering the people and discovering their use of the potent plants, Cortez ordered Aztec records destroyed so habits of drug use are known to us principally from the pious attacks made by Spanish friars upon the pagan practices which included plant use by Aztec priests for visionary communication with the gods of their pantheon. One of the plants used has been identified as the white-flowered morning glory, *Rivea corymbosa,* whose effects to the user are similar to those produced by LSD. The Aztecs also had a sacred mushroom, *teonanacatl* ("flesh of god"), which is the potent *Psilocybe mexicana,* a drug source in continued use today by *curanderas* and *curanderos* (female and male shamans or curers) who syncretize native beliefs with Christian elements in their healing chants and practices. These Mazatecs contend that the plant is a gift from Christ enabling them to communicate directly with Him when in a state induced by psilocybin. Psilocybin, first synthesized in 1958 by the Swiss chemist, Hofmann, has become widely used as one of the most powerful of the hallucinogenic drugs.

Another drug source known in Mexico is peyote, *Lophophora williamsii,* which is a cactus plant containing mescaline, a psychoactive alkaloid that stimulates vivid imagery so common to the cultists today in the Indian religious movement called the Native American Church. Peyote usage for magico-religious purposes began as early as the third century before Christ, but it was not until 1560 that the Spanish friar and historian Sahagun described the plant as a narcotic. The Spaniards denounced it as diabolical and suppressed its use in most of Mexico except in the north where, in the nineteenth century, its use was adopted as a basic feature in a religious syncretism of native beliefs and Christianity. The cult captured the imagination of neighboring Indian tribes in the United States and it diffused among tribes throughout the central and western states until at present peyotism is the most popular religion among American Indians (LaBarre, 1938; Slotkin, 1956).

Other mind-altering drugs include the mushroom. fly agaric (*Amanita muscaria*), the *Solanaceae* family of drugs of which the Thorn Apple (*Datura stramonium*) and the henbanes are common. All of these are highly toxic but many people have developed techniques that enable the users to remove the poisonous elements. The fly agaric has been used for centuries among the Siberian aborigines as an inebriant and the shamans consume considerable amounts to induce visionary states to accompany their frenzied performances. Datura and the henbanes were known to the ancient Greeks who possibly used the drugs to achieve a mental state in which they were possessed by the god. More recently the *Solanaceae* family of drugs were used in connection with European witchcraft to the extent that a Witch mania occurred from the fifteenth to the seventeenth centuries. The witches in taking the drugs experienced dreams and visions in which they participated in frenzied orgies and blasphemous, diabolical rites (Masters, 1962). These experiences were so vivid and realistic to the participants that many confessed to the Inquisitors to what they were convinced was factual.

Lysergic acid diethylamide, commonly referred to as LSD-25 or simply LSD, is a recent addition to the list of mind-affecting drugs. It is a synthesized derivative of the fungus ergot, *Claviceps purpurea,* and ranks with psilocybin as one of the most powerful psychochemicals. The Swiss chemist, Hofmann, did not discover the hallucinogenic properties of the drug until 1943. While the LSD state is rarely a bona fide psychosis, it does have symptomatic features commonly encountered among psychotics. Under LSD the individual may experience a variety of hallucinations, delusions, abnormal body sensations, time and space distortions, and other deviations from normal consciousness. Controversy exists as to the result of various studies about LSD effects but it seems that despite its demonstrated potential in psychotherapy it is considered dangerous with possible harmful results. Dr. Marvin Schwartz, a faculty member in the medical school at the University of Illinois, reported that the treatment of nine young suburban users within one year revealed, from cytogenic tests, chromosome damage in every case. It is still too early, commented Schwartz, to predict possible defects in the children of those suffering chromosomal damage (Chicago's *American,* May 22, 1968). Basing his conclusion on a larger sample, Dr. Maimon M. Cohen, associate professor of pediatrics in the division of human genetics at the State University of New York in Buffalo, reported that an examination of 220 LSD users revealed chromosomal breakage in from seventy to eighty per cent, or a rate four times as great as in normal persons. "Recent work indicates that quite apart from its

effect on the brain, LSD is a drug which can, in some cases, have lasting psychological and possibly serious physiological effects on other organs" (Chicago *Tribune*, April 11, 1968).

These brief selective references to mind-affecting drugs are obviously inadequate for presenting the variety of drugs used, the culture of the users, and the history associated with drugs. The writer plans an analytic treatment of such a study which falls outside the scope and purpose of the present paper. It is our purpose at the moment to focus attention on cultural factors causing drug use and addiction among a cultural group who enjoy unusual affluence with associated technological achievements and conveniences. The motivational pattern evidently is rather complex but must be delineated if ameliorative policies are to be instituted to contain a cancerous growth in American culture.

Motivations in drug use

Blum and associates conducted a study among five sample groups of LSD users whom they categorize as "the informal professional sample," "the experimental-subject sample," "the therapy-patient sample," "the informal black-market sample," and "the religious-medical-center sample" (1964:22-37). In response to their question as to why individuals in the different samples began using LSD, the "experimental-subject" users responded that they were motivated by curiosity, the same reason that sparked the "informal professional" group. The "therapy-patient" people stated that they took the drug in an effort to obtain a cure for a particular psychological problem and did so at their doctor's suggestion. The motivation reported by the "religious-medical-center" individuals was usually in quest of "self-knowledge" which they attempted to explain with such words as "self-expanding" and "becoming." The "informal black-market" persons identify the motive as the desire for aesthetic enhancement coupled with self-enhancement and curiosity in search for a new euphoric state.

While it is obvious that psychotherapy patients take drugs in conforming to medical advice to remove psychological problems, it is curious that Blum and associates discovered that these patients believed that they lived ordinary lives without extremes of elation or depression. The informal black-market sample represented the youngest individuals taking LSD but more significant is the fact they they did not take the drug because of deprivation but stated rather that they were motivated from a desire "to enhance an already pleasurable state of being rather than a desperate need to escape misery" (Blum, et al., 1964:41).

Barron raises the motivation question unequivocally when he asks: "Why on earth would a drug that profoundly affects consciousness and the efficiency of mental functioning in ways that are difficult to predict and that are potentially dangerous to the person who uses it become popular, especially among the young, the well educated and those who are well chanced in life?" (1967:3). As a preliminary comment before answering his own question, he assesses the historical factors leading to uncertainty and cultural ambiguity among American youth wherein the youth fail to commit themselves to traditional values and against which they engage in deviant behavior as a protest to culture values that seem irrelevant or meaningless. Hence Barron's suggested answer rests ultimately upon a pervading dissatisfaction most strikingly apparent among youth who challenge contemporary American culture for its failure to provide them satisfaction in goal orientation. We will return to an analysis of culture after some examination of Barron's "salient motivations" in the use of LSD (1967:9-12).

Barron's first motivation relates to "Persons interested in the experience primarily for reasons of aesthetic appreciation or expression." In essence the idea here is that our sociocultural milieu fosters a blase-marked populace to the extent that there is consequent monotony associated with technological conveniences readily available leaving man with a desperate quest for something novel and stimulating. Audio-visual media, effortless mobility, and incessant communication have made most experiences commonplace and this commonality is aggravated by occupational specialization wherein most people are seldom confronted with challenging, unsolved problems in relation to most of their total environment. The permissive and bestowing pattern characterizing most American parents provides little opportunity for their children to experience stimulating excitement in discovering some solution that relates to a meaningful life. Hallucinogenic drugs compensate for this cultural drabness by intensifying perception, altering the time sense, magnifying detail, and increasing the volume of imagery; in short, the drugs enable the individual to escape the routine of a culture marked with surfeit in experiences.

"Persons interested primarily in religious experience" is Barron's second salient motivation. Anthropologists have observed that people in American culture are not unique in their quest for an ecstatic state with transcendent meaning in relation to the supernatural world. The opening comments of this paper indicated this widespread desire. What is strikingly different in this quest between satiated persons in American culture and other cultures is that the former have increasingly resorted to psychoactive chemicals to achieve these states while others attain a transcendent condition by fasting, physical suffering, or rigorous contemplation (Bogoras, 1965:454-460; Lowie, 1956:237-255; Noss, 1963:273-275). This motivational factor assumes such importance in the thinking of the author that extended discussion will follow later in this paper.

The third motivation cited is "Persons seeking a cure for alcoholism." While admitting that alcoholic addicts do resort to psychedelic drug treatment in hope to effect an escape from their dilemma, this motivating factor is of secondary importance for it avoids the primary consideration as to why the alcoholic became an addict in the first place. Our contention is that fundamental culture factors are at play in creating al-

coholic and/or drug addiction. In his study of alcohol and culture, Mandelbaum cites Horton's views on the functions of alcohol among primitives with special note of the latter's conclusion that the amount of alcohol consumed correlated positively with anxiety created by various cultural circumstances (1965:287). From this and similar studies we may assume that anxiety contributes to alcoholic addiction in America; as a matter of fact the psychoanalyst, Karen Horney makes this quite explicit when she observes that our culture is anxiety ridden to the point of neurosis. She has discovered that a common means to alleviating anxiety is "to narcotize it. This may be done consciously and literally by taking to alcohol or drugs" (1937:52). One need not dismiss the fact that psychedelic drugs used in psychotherapy under the supervision of a qualified medical practitioner shows some promise as a remedial means, but therapeutic use of drugs for alcoholism or mental disturbances takes us somewhat afield from the present consideration and will not be pursued.

Barron's next motivational factor is stated thus: "Persons seeking relief from personal psychological problems of a neurotic sort." Again this causal factor avoids ultimate impetus for, as in the case of alcoholic addiction, the psychological disturbance has some cause in the first place and must be diagnosed if therapeutic drug prescription is to effect enduring cure. The use of LSD or similar drugs is not motivated directly from self-impulse or desire but arises in consent to prescription by a practitioner who has gained the patient's confidence and compliance. Our interest from the cultural perspective is to inquire beyond the neurosis to the primary forces at play. We have already indicated that this study cannot address itself to drug use for therapy although we can note that Masters and Houston have summarized the controversy existing in relation to hallucinogenic drugs in psychotherapy. The evidence leads them to the generalization that drug use is beneficial in those cases where a drug-induced catharsis leads to the exposure of repressed memories and enables the patient to gain confrontation with his "real self" (1966).

The next motivation cited by Barron follows logically the one just discussed; it is that "Seriously disturbed persons" have reached extreme abnormality and "are potentially suicidal or psychotic . . ." The motivation in this case is an act of desperation which leads them to try mind-altering drugs as the last resort to escape suicidal urges by what they hope will be a "break through" to a regenerative perspective in life. Turning to LSD or similar drugs may fail in these cases with deplorable results for the drug state may actually aggravate their chaotic psychic condition to the point that they do commit suicide. Incidentally these cases are exploited by the popular news media and inaccuracies are conveyed to the naive who are unaware of the psychic state of the person prior to his resorting to a drug. It is quite certain that a qualified psychotherapist would not prescribe psychedelic drugs for the treatment of such cases. At the risk of boring the reader, the author doggedly insists that motivation in such cases is secondary and to confine our attention to this cause is to avoid coming to grips with the factors at play in producing psychosis.

"Persons who are chronic social delinquents" is listed by Barron as the sixth motivation for drug use. These persons are in revolt against their society and culture and use drugs as a retaliatory means to demonstrate their revolt. While admitting that Barron may be correct in citing this as a cause, we must again take issue on the basis that the why of delinquency remains unanswered but must be considered if remedial steps are to be taken. Why are there "sociopaths" who often resort to drug use? In a cultural analysis of these cases, we believe it is imperative to seek for those elements in the individual's enculturation or socialization process that caused him to fail in acquiring moral and ethical appreciation and social responsibility. Our chain of thought goes thus: if condition C (the use of drugs) is the result of condition B (social delinquency), we have sidestepped the preliminary condition A which we contend is a complex of factors that may be abstracted in the concept of the individual's culture. Our question then persists: What are the culture factors at play in causing many people, especially privileged youth, in American life to use dangerous mind-affecting drugs?

The Culture Concept

To answer the question that relates drug use to culture, it may be helpful to elucidate the culture concept as held in anthropological thought. Culture is a term used widely but proves to be a difficult concept to define as the two noted anthropologists, Kroeber and Kluckhohn, emphasized in their effort some years ago (1963). After listing many definitions under such categories as descriptive, historical, normative, psychological, structural, genetic, and others, they concluded that:

> "Culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other, as conditioning elements of further action" (1963:337).

An analysis of the implications contained in this somewhat complex definition would take us far afield therefore we shall select certain phrases that may satisfactorily clarify the culture concept as it relates to the present paper. It seems clear that culture constitutes behavioral patterns characteristic of human societies. These "ways of life" or "designs for living" are dynamic with alterations occurring at varying rates and which result from such factors as invention, diffusion, and ecology. As a culture develops it is significant that within the patterned behaviors there are key influential relationships that affect members of the system. When accelerated change occurs, the culture structure may be weakened with adverse effects to the members undergoing acculturation or enculturation. The result is deviance from culture values or norms by those con-

fused by the seemingly erratic behavior and capricious value attitudes of innovators.

A society's culture includes many institutions such as the family, kinship, religion, education, economy, political organization, law, art, and others. All of these play some role in the enculturative process, and, if marked by integration and interrelational harmony, the individual acquires confidence in his interdependence and interaction with fellow members in his culture. He can expect or predict certain reactions from his fellows indicated by cues in a symbolic system. In contrast when change disrupts the system and destroys consistency in the behavior patterns, the member becomes uncertain not knowing what to expect and is fearful of interactional consequences with resultant anxiety. This briefly is the relevant and poignant implications of culture and change with their influence upon members in a society. A great diversity of patterns exists in a large society characterized by a complex culture such as America, hence on the basis of certain culture traits the large complex whole may be segmented into classes or groups which are commonly referred to as subcultures which share certain traits with the larger society but are distinguished by secondary traits such as economic status or religious affiliation.

It is immediately evident that culture is an abstraction even as such concepts as society and economy are. Therefore to conclude that culture influences individuals is merely a convenient mode for referring to the fact that individuals characterized with certain attitudes, emotions, and behaviors influence other individuals. One must remember however that culture means shared traits hence in influencing another, the individual is to a considerable degree reflecting the attitudes and behavior that are normative in his culture. This is asserting that there is a relationship between a person's culture and his personality. We need not subscribe to exterme cultural determinism in our conclusion that culture is a molding force to its members for each individual is unique due in part to the fact that he exercises choice within the latitudinal boundaries of his culture. Allport supports this conclusion with these words:

> "Culture is indeed a major condition in becoming. Yet personal integration is always the more basic fact . . . Some elements in our culture we reject altogether; many we adopt as more opportunistic habits, and even those elements that we genuinely appropriate we refashion to fit our own personal style of life. Culture is a condition of becoming but it is not the full stencil" (quoted in Goodman, 1967:13).

It is common knowledge that the most forceful traditional agents for enculturation in America are the family, the school, and the Church. Now in the twentieth century the trend seems to be toward increasing influence by the peer group and formal education with a decline of molding force by a weakening family and an equivocating Church. The dynamic factors affecting the family, the school, and the Church are not limited to any one segment of American culture for, as Hoebel writes that despite diverse backgrounds of immigrants, the wide range in beliefs from atheism to devout evangelicalism, and the broad spectrum of interests in terms of occupation, recreation, and education, there is a recognizable American world view (1966:498-500). Within this world view, Hoebel sees a number of major themes one of which is appropriate to our consideration because it has greatly influenced change in the three enculturative institutions. Hoebel labels this theme "rationalism and the mechanistic view" by which he means that American thought patterns are dominated by rationalism rather than mysticism, and the "operative conception of the universe is mechanistic." This rational-mechanistic view is overwhelmingly a mystic-vitalistic view with action rather than contemplation taking precedence. This action orientation in turn leads to an "emphasis upon technology and science rather than upon philosophy and the arts." In the end Americans who live in an impersonal, industrialized and urbanized culture made possible by technology and science are threatened by accompanying socio-cultural phenomena with dire consequences. The family and the Church have felt the full impact of this world view and, in the opinion of this writer, reflect a vulnerability in the youth with their behavioral deviances including drug use and habituation.

Before directing our attention to contemporary conditions marking the American family and religion, we may profitably explore briefly the stimulating insight into culture by the founder of psychoanalysis, Freud. We need not indiscriminately subscribe to all of Freud's conclusions in his work entitled *Civilization and Its Discontents* where he emphasizes the effects of repression on the individual. In fact Marcuse has examined Freud's thinking and agrees that there is both repression originating in the individual (ontogenesis) and in cultures (phylogenesis) (1962). Repression, according to Marcuse's interpretation of Freud, may be considered a nontechnical term referring to both conscious and unconscious processes of restraint and suppression. It is generally granted that Freud's proposition is correct in that culture rests upon the subjugation of human instincts, but the notion that there is intolerable suffering incurred by individuals for the benefit of culture is not to be taken too seriously. Free gratification of human instinctual needs is incompatible with a cultural system whether that system be considered primitive or civilized. No culture can long tolerate uninhibited expression of aggression manifested in homicide, sex, or other forms of exploiting one's fellows. The social consequences are disorganization and chaos. This fact has been demonstrated by many studies in the field of cultural dynamics where changes in culture have disrupted the system for a time only to be followed by an emergent system exercising new forms of restraint (Spicer, 1952).

Freud's emphasis upon repression assumes validity for this study when the fact is recognized that, while all cultures impose restrictions on their members, the significance of the restraints is more apparent among the so-called primitive or folk cultures, while the complex and urbanized American culture with its contractural relationships impose controls that tend to be

much more obscure in terms of the control's relevance to human survival and satisfaction. Thus the imposition of limitations on entertainment or recreation sources by parents with puritanical traditions on their children may be difficult to enforce let alone to defend these restraints with a reasonable and meaningful explanation. There is a formidable array of suppressions in a complex culture but these tend to be accepted unless, as in the American case, the culture is undergoing dramatic change where there is a perpetuation of restraints formerly meaningful and relevant but are now obscure and even irrelevant. The consequence of what may be called a repressive anachronism is that institutional supervision is rejected by those who seek subconscious retaliation by delinquent behavior including drug use. Freud's "discontents" are readily observed therefore among the restive youth seeking meaning to life through the psychedelic experience as well as in the "hippie" movement and, in drastic cases, the revolt against the controls of institutionalized education occurring on college campuses (*Time*, May 3, 1968, pp. 24-25).

With these comments on culture in general, we can now direct our attention to an analysis of two institutions critical to inegrative functioning in every culture. The two institutions are the family and religion both of which are in a state of flux in American culture to the degree that their effectiveness is sharply curtailed.

The American Family Crisis

"The family of the last few decades has grown ever more unstable, until it has reached the point of actual disintegration" is the pessimistic conclusion offered by Sorokin (1941:188). While such a judgment is open to challenge as it has been by some scholars, it is quite apparent that the American family has undergone alteration from a relatively close-knit group marked by parental authority to a loose, atomistic arrangement that frequently ends in divorce or by the desertion of a parent. Zimmerman's gloomy summary written two decades ago may be extreme but it cannot be ignored.

> "The western world has entered a period of demoralization comparable to the periods when both Greece and Rome turned from growth to decay. Divorce, premarital sex experience, promiscuity, homosexuality, versatility in sex, birth control carried to excess, spread of birth control to every segment of the population, positive antagonism to parenthood, clandestine marriage, migratory divorce, marriage for sex alone, contempt for familism . . . all are increasing rapidly" (1947:632).

This interpretation is not unique for it is shared with other scholars who compare the western family with those in non-western cultures. For example Ruth Anshen, in her introductory chapter to a book devoted to cross-cultural comparison of families, provides a penetrating resume of recurring crises and repeated chaos marking the western family (1959). She links the decline of the family with a deterioration of philosophy, morality, and religion in western culture while contending that similar family crises have not occurred in other great civilizations such as China and India where concepts of morality and ethics were maintained by recognizing religious authority.

Anshen also traces the philosophical roots of the dissolution of family values in post Hellenistic society that was consequent to an emphasis upon the individual. She notes that Plutarch, writing in the New Testament period, points out that the moral virtues supporting the Helenistic society and family had disappeared. "Fidelity, chastity, the begetting and rearing of children, the loyalty of man to man—in short, moral integrity—had been dissipated in every stratum of Greek society" (Anshen, 1959:11). This was the inevitable result of extolling the atomistic quality in society with individual isolation. Anshen believes that like tragic consequences are apparent in the American family stemming from the relative isolation of its members. The Roman family, after passing through a state similar to that in the Homeric and Hesiodic periods, reproduced in facsimile the early Greek family history and became a prototype of the decadence in the modern family demoralized by wealth, ease, hedonism. The Christian church succeeded in restoring stable family structure to the western world for centuries during which time the family became a vehicle of cultural stabilization and bestowed upon the individual member freedom and security. This ideal has been disappearing from modern western culture at an accelerating pace.

In contemporary American culture motherhood has been reduced to a "science"—a mere technique which robs the individual of certain indispensable, integrating influences which earlier served as a cohesive force in society. The following statement by Anshen in summarizing the dire consequences needs no comment.

> "The child, confronted with the collective, anonymous forces of an industrialized social order, finds himself isolated, insecure, and manifesting an ensuing disintegration of conscience and consciousness. Sexual relations are dominated by social expediencies. The sacrament of marriage, constituting a reconciliation of nature and civilization, is contaminated by erotic excesses and prostitution. Marriage degenerates into a cachet of social sanctions, a mere utilitarianism, an instrument of conformity in the mechanism of society. Instinctual and intuitional love, moral integrity, religious needs, the very spiritual substance of man are all constantly adapted to the demands of a pragmatic culture, and the processes of civilization reveal the frustrations rooted in this tendency" (1959:19).

It is axiomatic that the family plays a predominant role in personality formation. General agreement prevails among scholars likewise that this familial influence is maximized during the early years of childhood, or to quote Goodman: "By age six, or thereabout, the child's personality will have assumed enduring contours. Later experiences will develop detail within these contours, perhaps alter them to some or a considerable degree. However, these later developments must occur either within or against the early configuration" (1968: 178).

Clinical psychologists, psychiatrists, and psychoanalysts have explored the dynamic process in personality formation in the child and have detected the imperative need of acceptance and affection if the child is to attain satisfactory mental health in later life. Bowlby emphasizes how important affectionate care is to normal child maturation in his article "Child Care and the Growth of Love" (Krich, 1960:118-127).

His analysis is unequivocal when he insists that the child, even in infancy, senses hypocrisy in parents whose marital and parental relationships rest upon sexual or social expediency rather than emotional attachment and compatibility. Bowlby's conclusions are supported by considerable evidence amassed from sociological, psychiatric, and psychoanalytic research (1966). Perhaps his views are somewhat vitiated by an over emphasis on the maternal-child dyad, but it seems unreasonable to dismiss his evidence that links mental disturbances and delinquency to "maternal deprivation." One of Bowlby's key statements is:

> "Evidence that the deprivation of mother-love in early childhood can have far-reaching effects on the mental health and personality development of human beings comes from many sources . . . Such evidence is disquieting, but skeptics may question whether the retardation is permanent and whether the symptoms of illness may not easily be overcome. The restrospective and follow-up studies make it clear that such optimism is not always justified and that some children are gravely damaged for life. This is a sombre conclusion which must now be regarded as established" (1966:15).

The neglect of children tends to be aggravated among families marked by socio-economic disadvantages hence the incidence of delinquency is higher in slum and ghetto areas. The combination of parental indifference, for whatever reason, and socio-economic deprivation produces children whose orientation is toward delinquency accompanied by moods of pessimism, unhappiness, a sense of futility, mistrust, negativism, defiance, and a manipulative attitude to exploit life. Chein and his associates discovered however that, even in depressed urban settings where drug habituation is high, those with more fortunate family circumstances were not among the drug users (1964:13). In contrast according to this same study, the home life of addicts is conducive to the development of disturbed personalities. In the homes of those addicted to drugs, parental harmony and affection were absent with separation, divorce, desertion, overt hostility, or lack of warmth quite apparent. The parents were uncertain about the standards of behavior expected from the children and inconsistent in the application of discipline; the children tended to be over-indulged or harshly frustrated.

But drug use and habituation is not confined to delinquent youth from disadvantaged homes as reported by Chein and his associates. Increasing numbers of users are members in families of the middle and upper classes. We may then ask the question concerning the family rapport or esprit de corps when the family circumstances cannot be included among those marked by social and economic deprivation. Most social scientists hold that the middle class family is typical in American society, therefore Raab and Selznick's analysis of the modern family may be accepted as fair reference to the typical American family (1964:-310-11). They compare the closely-knit rural family, formerly predominant in America, with the present urban family. The unity of beliefs and attitudes characteristic of the highly integrated and interdependent rural family have been replaced by individualism and atomization in the urbanized home. Divorce and delinquency reflect family disharmony and tension while contemporary family life fails to win the affection of the youth and to inculcate positive values and self-discipline essential to satisfactory participation in society. The revolt of youth is no longer restricted to disadvantaged homes for even the best situated families find it difficult to control their children.

The theory then that is proposed in an analysis of American culture is that the fragmentation of the family, including affectionate deprivation, is a contributing factor to increasing drug use among youth. This conclusion correlates with Louria's recommendation that an effective attack on hallucinogen abuse includes restrictive laws to control illicit sale and possession, education, and *"strengthening the family unit"* (1967:45. Italics added). He argues that family life with cohesion and affection will produce youth free from insecurity and will enable the young people to acquire stability in personality to withstand the lure of drug proselyters.

Granted that family unity is highly desirable and imperative to combat the threat of drug use among youth, the problem centers about how to restore harmony, common beliefs and attitudes, and affection to the American family. Bowlby suggests that a revitalized family relationship is dependent on economic, social, and medical factors (1966:84). The deterioration in the American middle class family refutes Bowlby's argument for there is no actual economic lack, social deprivation, or medical neglect in the overwhelming majority of these typical families. The question therefore remains: How can the contemporary family gain stabilization with mutually-shared objectives and values including love that together are conducive for congenial child rearing? It seems certain that familial warmth and affection cannot be effected by legislation or even by economic aid to those who are poverty stricken. Education, which has become an obsession to the point of apotheosis in Western culture, seems to offer possibilities but, on second thought, it is involved in controversy as to objectivity and subjectivity in the treatment of values. The unanswered question among educational leaders is whether education is to be analytic, evaluative, or directive. One needs only to recall that Germany prior to World War II was recognized as most prestigous in educational realms but its educational goals failed to prevent the consequent cataclysm and fiasco. Furthermore drug use is not a problem rising from illiterate families; it has become a matter of grave concern as the result of its use and addiction among those enjoying unusual educational advantages.

We must therefore direct our attention to other cultural factors to find answers to the drug dilemma with the hope that in discovering the cause we can also make prescription for effective cure. The traditional association of the American ethos with its system of values has been in the mystical or supernatural realm of religion which Tillich has aptly described as the ultimate concern of man. A consideration of causal factors in harmful drug use in American culture would be futile and inaccurate without exploring the spiritual heritage and contemporary situation which involves

most members of our society.

The Spiritual Vacuum in Western Culture

The literature devoted to examining the religious heritage, development, change, diversity, and decline is overwhelming with scholars from practically the entire spectrum of learned disciplines contributing their insights and interpretations of what religion has or has not meant to Western culture. The problem therefore is one of selection on the basis of what, in this author's opinion, represents an accurate and valid description. Undoubtedly any selection will be subject to objection and criticism by the very fact that such diverse views are held in relation to a controversial subject and which are held with considerable emotion by those interested. We must not however allow the reality of opposition or disagreement to deter us from an effort to see if spirituality, or its lack, has some correlation with conditions fostering drug use.

The philosophical psychotherapist, Carl G. Jung, gives considerable attention to analyzing modern man's ineffectual spiritual state which, Jung believes after long experience in treating persons with mental problems, is due to a decline in religious force and emphasis in western man's life. In his work, *Modern Man in Search of a Soul*, Jung epitomizes much of his thinking in a chapter entitled "The Spiritual Problems of Modern Man" and offers suggestions to this writer's consideration of the cultural role in man's quest for spiritual euphoria by means of abnormal psychological states (1933:196-220). Jung uses the term "conscious" and "unconscious" in a technical manner which must be understood in order to appreciate the thrust of his observations. He states that modern or western man is one who is quite "conscious" of the present to the point that man's interests, emphasis, and efforts are directed to the immediate circumstances. What this means is, if we understand Jung's thinking, that man has removed himself from the context of a "common unconsciousness" which has characterized most of mankind throughout human history. This focus on the conscious with abandonment of the unconscious leaves man without spiritual moorings necessary to normalcy in mental health.

This conceptualization readily adapts itself to the culture concept as held by anthropologists. By such adaption we may conclude that modern man is in revolt against the very thing that is essential to mental stability and normalcy, that is, the culture content of which we are not conscious or aware but which provides to the individual the sense of meaning and satisfaction. Thus the ethnographer may pose the following question to a primitive: Why do you think that this is true? And the response typically is: Because we have always so thought. The primitive has little interest in questioning the present in his conviction that the present is fused with the past and the future. Modern man has little interest in the values and strivings of past cultures except from the historical standpoint with its superficial attention to exotic customs of bygone eras. "Thus he has become 'unhistorical' in the deepest sense and has estranged himself from the mass of men who live entirely within the bounds of tradition." In repudiating the historical context, western man is marked by the loneliness with its associated meaninglessness; he has cut himself adrift from vital cultural moorings for aimless wandering on the waters of uncertainty.

This sombre phenomenon relates directly to the necessity of spiritual reality for one of the most venerable traditional views held by man is that he possesses a soul with an eternal destiny. The soul has been viewed as the immortal essence of man in the western world for millenia (Jennings, 1967). Twentieth century secularists have challenged the soul concept in dealing with the larger question about the reality of the supernatural realm. The consequence of this skepticism by western man is that he must rely upon himself in the face of apparent impotence. He denies the fundamental notion in spiritual or religious beliefs; this focal idea is that of dependence upon resources beyond those that have proven to be futile and frustrating. This position is quite different to that held by medieval man who held that men were children of God and under the loving care of the Most High who readied human creatures for eternal blessedness. Man knew then precisely the manner of conduct by which they could overcome a corruptible world while possessing a relatively high degree of contentment to stabilize their personality with its convictions and emotional configuration. The assumption was that the Bible was the infallible guide to a knowledge of God, to man's relationship to God through faith in Jesus Christ, and to conduct with fellow man.

As a segment of western culture, Americans have called into question the mystical certainties held by western man a few centuries ago and have replaced these verities with the ideals of material security, general welfare, and humaneness. The spiritual heritage has been replaced by scientific and technological materialism. One cannot deny the beneficial contributions of science—a visit to a modern hospital is most convincing—but the apotheosis of science or scientism has destroyed the sanctuary of spiritual reality to which man could retreat when confronted with overwhelming circumstances. Materialism, enhanced by scientism, has increasingly permeated western man's world view to the point that relatively few thinkers today subscribe to a cautionary assertion made two thousand years ago: "For what good is it for a man to gain the whole world at the price of his own soul? What could a man offer to buy back his soul once he had lost it?" (Matthew 16:26, Phillips version). Modern man has exchanged faith in spiritual postulates for a faith in scientific propositions and in rejecting the former he believes that existential circumstances are the sole source for ultimate validity.

Now in the grip of this secularistic world view, modern man may be interested in the observation of a so-called primitive man who stands apart from this

position. Jung relates the confidential evaluation of the white man by a Pueblo Indian who confessed, "We don't understand the whites; they are always wanting something—always restless—always looking for something. What is it? We don't know. We can't understand them. They have such sharp noses, such thin cruel lips, such lines in their faces. We think they are all crazy" (1933:213). This perceptive insight notes the aggravated restlessness and aimlessness of those lacking the certainties of spiritual values. Or for many who identify with Christianity their profession lacks dynamic application to a creative wholeness essential to giving faith meaningfulness. An ancient Islamic axiom sums up modern man's predicament: "A man without belief in God is like a drunken man with a sword."

Religion, the acknowledgment of human limitations and ultimate dependence, is universal in all cultures. No attempt can be made within the scope of the present paper to demonstrate the "truth" of any religion other than to confess that the author identifies positively with evangelical Christianity. The question of the "truth" or "falseness" of any religion is avoided by anthropologists but there is agreement that whatever the religion it performs functions in human cultures that no other institution seems to be able to do (Lessa and Vogt, 1965:41-88). Even ardent scientists admit that ultimately there are limitations to scientific nature by the very fact that the practitioners are fallible. Lowie, in reflecting along this line of thought toward the close of a life marked by brilliant scientific studies of man, concluded that the "average man" cannot be satisfied with science as a substitute for religion. Science, he believed, is a dynamic and developing phenomenon with great opportunities but which ultimately cannot replace religion as a source of peace and security. Science deals with probabilities, religion with certainties (Lowie, 1963).

These extended comments on religion may seem to have taken us from the central theme under consideration, but it is an effort to emphasize that modern Americans have rejected spiritual forces. The result is uncertainty, fear, and anxiety that underlie the institutional structure of the culture. In a state of limbo, Americans seek to discover existential havens or meaningful experiences by various means including those offered by hallucinogenic drugs. Frequently drug-induced states are considered to be religious experiences so it is logical to give attention to this phenomenon.

The Peyote Cult is an excellent example of drug use to effect religious experiences. Slotkin, formerly a member and officer in the Native American Church or the Peyote Cult, points out that the central feature of this syncretism of native beliefs and Christianity is the hallucinatory state induced by ingesting peyote with its mescaline ingredient (1956). The Peyotists contend that in the drug-induced state they receive spiritual power and power for appropriate and satisfying behavior for each earnest participant. By observing the rite properly, the individual's sensibility is heightened either in reference to himself (introspection) or to others (mental telepathy). The introspection is an intensive self-evaluation which leads to silent or vocal prayer to God, confession of sins, repentence, and consecration to the Peyote ethic in the future. The heightened sensibility toward others contributes to a feeling that there is mutual influence between persons by their thoughts. Glossolalia sometimes occurs in this mental telepathic state (Jennings, 1968:13). The Peyote Cult is of course not a feature in the main stream of American culture but is the religion of American Indians who have been both exploited and influenced by western culture. Its significance for this study is that it reveals that psychedelic drugs provide meaning to those who have lost many of their traditional values. It is not difficult to find examples of a similar phenomenon among contemporary Americans. Masters and Houston devote an entire chapter in their study to what they call "Religious and Mystical Experience" in which they conclude, after examining the case histories of drug users, that "the most profound and transforming psychedelic experiences have been those regarded by the subjects as religious" (1966:247). In the work by Blum and associates, a chapter entitled "Psychedelic Experience and Religious Belief" is included to analyze the social utility of LSD for mystical-religious purposes, such as enhancement or weakening of accepted religious, moral, ethical, and dogmatic attitudes and beliefs (1964:187-198). The chapter focuses on a sample of forty-two drug users who were asked thirteen questions about religious beliefs and changes. A summary of the basic findings are:

"1. Sixty per cent stated their religious feelings were changed:
   a. Thirty percent experienced a deeper understanding of their previous religious feelings and felt closer to their church.
   b. Thirty per cent experienced a change in their religious thinking in a variety of ways.
"2. Sixty per cent trusted God (or life) more; 35 per cent trusted people more.
"3. Forty per cent indicated their understanding of the teachings of their own church had changed, largely toward an increased understanding of doctrine.
"4. Forty per cent expressed lessened anxiety regarding death, elaborating this in a variety of ways.
"5. Thirty per cent felt a greater conviction of the existence of a supreme being.
"6. Eighty per cent stated they were more secure people.
"7. Fifty per cent indicated they were freer, more tolerant, or less guarded. Sixty per cent felt their personal conduct had changed for the better: 30 per cent believed their moral standards had changed toward increased personal responsibility.
"8. Forty per cent felt a different relation between themselves and other people" (Blum, et al. 1964:188).

Insofar as the authors in this study were able to ascertain, the drug effect added nothing new to the individual unconscious of each subject. Rather the drug-induced state brought into conscious awareness what was already present. This raises a question: Is God the unconscious of man? The answer must be no, for to the Christian the gift of eternal life is associated with meaning, value, direction, and purpose experientially revealed by the act of God in Christ. Meditation and prayer are the traditional paths of increasing the

awareness of the Divine Presence as evidence of the gift. Has our secularistic culture robbed us of meditational exercise to the extent that it is necessary to resort to psychedelic drugs to make spiritual life meaningful?

A fascinating testimony is provided by Jane Dunlap (pseudonym) who describes vividly her personal experience with LSD. Her statement explicitly gives the reason why many Americans have become drug users so we may do well to quote her at length.

"People naturally want to know why I wished to take LSD. The fact that related substances were used for religious purposes interested me profoundly, and I had heard that LSD experiences were often deeply spiritual. For many years it has seemed to me that, before any of us can have truly fulfilling lives, we must develop intellectually, physically, emotionally, and spiritually. Intellectual and physical development are tremendously stressed in our culture, perhaps over-stressed. Emotional and spiritual development, I feel, are both neglected and underestimated. Through several years of painful but glorious psychoanalysis and psychotherapy, I have done considerable maturing emotionally and laid the foundation for further emotional growth. Intellectually I could have done better but also worse . . . When it came to spiritual attainment, my development was so pitifully inadequate that *I sometimes felt consumed with an empty yearning* . . .

"Although growth means constant change and development, my belief in God and feelings about Him stayed much the same year after year except that I discarded my concepts of heaven and hell. In short, I was in a spiritual rut; furthermore I had no idea how to get out of it. *Frankly I feel that I had a great deal of company and that my rut was really quite crowded.* For these reasons, when filling out a questionnaire which asked, 'Why do you wish to take lysergic acid?' I wrote: 'In hope of overcoming spiritual poverty.' Another time I filled the blank with: 'To get chemical Christianity'" (Dunlap, 1961:12-14. Italics added.).

The evidence sustains Mrs. Dunlap's opinion that her state of spiritual poverty and lack of meaning in life pervades the condition of people in western culture. The pathos in discovering this fact is that dangerous mind-affecting drugs are resorted to in an effort to fill the spiritual void. The noted English historian, Arnold Toynbee, gave an appraisal recently of American culture in which he observed that one of our American weaknesses is that we have lost the "art of contemplation" and "the inward spiritual form of religion" (*Life,* December 8, 1967). An editorial in a widely read Christian periodical, in commenting on Toynbee's assertions, states: "Partly because of our churches' neglect of this aspect of Christianity, American young people have turned to drugs to find what they call a significant religious experience. But now many seem to be forsaking drugs and turning back to some of the contemplative religions of the Far East. Let us hope that before long they will discover the authentic mysticism at the heart of the Christian faith" (*Christianity Today,* May 24, 1968).

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FROM DEISM TO DEICIDE: WHY GOD "DIED."

BY EDWARD P. COLESON*

The recent "God is dead" controversy has stirred a good many people who have not gotten excited about theology for a long, long time. Yet anyone who has watched the trends over the years can hardly be amazed at this development. This is but the logical conclusion of centuries of philosophical "evolution," the ultimate destination of a course that the scholarly world has been pursuing for many a year. In fact, one wonders why people are so excited over the "death" of a God who long ago became almost irrelevant to Western man. Let us trace this transition from the "Age of Faith" to the present hour. Perhaps as an introduction to this discussion, it would help to focus our thinking on the issues involved if we would consider the sort of "death notice" for the morning papers which would be appropriate in this case—if we may speak of God thus without being blasphemous or even irreverent. Such a news item might read as follows:

The tragic and seemingly sudden passing of the Almighty, Maker of heaven and earth, has been a distinct shock to a multitude of people beyond the immediate circle of friends. Yet those who insist that they are most intimately acquainted with the inner workings of Universe Incorporated claim that the Founder of the firm had not taken an active part in the business for a long time now. It seems that the junior partner, Homo Sapiens, has pretty well managed the company in recent years, with the Creator and former Manager becoming increasingly less active. They assure us that there is no reason to believe that the demise of the Most High will make any difference whatsoever in the practical affairs of the organization; in other words, business as usual. Many people are relieved to know this. Still they feel a deep sense of personal loss in the passing of the Deceased—One they have known at least casually since the days they repeated "Now I lay me down to sleep" at their mothers' knee. This newspaper, *The Cosmic Courier,* wishes to express its profound sympathy to the bereaved in this hour of great loss.

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Justifiable Deicide?

The above bit of fantasy may seem to border on the sacreligious, but I trust it will shock us into seeing the present situation for what it is: there have been few, even among the devout, in recent years who have appealed to their Lord and His Book as the ultimate Authority on any practical question whatever. The Bible is simply a devotional manual, according to present day thinking. The Communist may say, "It is written in Marx" or "Lenin dixit," but "Thus saith the Lord" is obsolete even among professed Christians. While many good people resent the blatant arrogance of the "God-is-dead" theologians, their resentment seems to arise from their feeling that this

is in bad taste, rather than the conviction that God makes any particular difference in the practical affairs of life. Furthermore, modern man's detached view of his Creator is not the work of this new crop of heretics: shortly after World War II a survey, reported by *Reader's Digest*,[1] found that while most Americans insist that they believe in a Supreme Being, few could see any connection between their faith and the problems of living in this present world. The student[2] of a few years ago, one of the "unsilent generation" who thought he could afford to be "indifferent to an indifferent god," was very much a product of his age. God has simply become irrelevant in the contemporary world, or so a multitude of people--both pious and impious--seem to think.

Modern man's casual attitude with respect to his Creator contrasts strangely with the profound convictions of our Puritan ancestors,[3] as is evident from the following brief quotation:

> The Puritan was a Scripturist, a Scripturist with all of his heart. . . . He cherished the scheme of looking to the Word of God as his sole and universal directory. The Word had been but lately made the common property. . . . The Puritan searched the Bible, not only for principles and rules, but for mandates—and, when he could find none of these, for analogies —to guide him in precise arrangements of public administration, and in the minutest points of individual conduct.

Now while I am very willing to allow that the Puritans were carried away by their enthusiasm and tried to read too much into Scripture, are we justified in going to the opposite extreme of seeing nothing there, except of such a heavenly nature that it has no earthly application? It is well to remember that God was irrelevant in the eyes of modern man long before He "died." I might mention parenthetically that I am quite weary of the continuing tendency of our time to downgrade our Puritan heritage. There may have been self-righteous Pharisees among them, this I will concede. But by a reversal of the ancient pattern today's "publicans and sinners" are thankful they are not Pharisees! Is this any improvement?

God's Law in Human History

The Puritan appeal to God as the Ultimate Authority was in no sense unique or even new in human history. Back in the classic Greek period Antigone[4] could remind a tyrant:

> Thy writ, O king,
> Hath not such potence as will overweigh.
> The Laws of God . . . fixed
> From everlasting to eternity.

The concept of a Higher Law, given by the Supreme Lawgiver Himself, is of course basic to the whole of Hebrew history also and long before the Golden Age of Greece. Unlike the usual oriental despots the kings of the Chosen People were constitutional monarchs, "under God and under the Law", as Henry de Bracton so well expressed it in thirteenth century England. But the early Jews were not philosophers: the Greek Stoics elaborated the doctrine of a Higher Law and Cicero appealed to the Law of God as a sure foundation as the Roman Republic was breaking up about him. In the centuries which followed Christian thinkers, such as St. Augustine and St. Thomas, took up the theme. So it has always been: much as Caesar had his Brutus and Charles I his Cromwell, so in a constructive way David had his Nathan, Ahab his Elijah, and Mary Queen of Scots her John Knox. The best defense against tyrants down across the ages has been the appeal to a Higher Power. It would surely have helped if more Germans had continually reminded Hitler: "Gott ist mein Führer!" We in the democracies also need this steadying influence for the voice of the people is not the voice of God.

Perhaps the classic expression of the doctrine of a Higher Law is to be found in William Blackstone's *Commentary*, published in 1765. The American colonists seized upon this work with the greatest enthusiasm, finding in it an antidote for the tyranny of George III. A decade later on the eve of the American Revolution Edmund Burke could assure Parliament that there were "nearly as many of Blackstone's *Commentaries* in America as in England." The following brief quotation will serve to illustrate Blackstone's[5] approach to the problem of ultimate authority:

> This law of nature, . . . dictated by God Himself, is of course superior in obligation to any other. It is binding over all the globe in all countries, and at all times: no human laws are of any validity, if contrary to this; and such of them as are valid derive all their force . . . from this original.

It should be immediately apparent to the reader that the notions of modern man contrast strangely with the convictions of Blackstone and the Founding Fathers of this nation. Walter Terence Stace[6] well expressed the dominant philosophy of our age in his "Science and Faith" a few years ago. He reminds us that all previous advanced cultures have believed that the "world is a moral order," but then goes on to tell us that our contemporaries commonly hold the opposite view. According to present day social scientists, he continues, moral codes are purely human arrangements—and one might add, like prices, are subject to change without notice. Stace allows that this is why the foundations of society are crumbling and urges that we devise what might be called a scientific moral code to take the place of our outmoded system of ethics which was founded upon religion. In the light of a few thousand years of philosophical endeavor, one might well ask what the chances of success would be for a moral "operation bootstraps."

From Deism to Darwinism: God Becomes Unnecessary

Moses commanded Joshua when he came into the Promised Land to deploy the Twelve Tribes on the twin mountain peaks of Ebal and Gerizim (Deut. Chap. 27 through 30), so that the people might make a dramatic and very definite choice between good and evil: "Behold, I set before you this day a blessing and a curse" (Deut. 11:26). This is so different from present day thinking: we would gather all the folks down in the valley between the two hills—the "middle-of-the-road" position with no choice involved at all. At the Mountains of Blessing and Cursing the Hebrews made a contract with Jehovah to obey Him, with the understanding that disobedience would bring the direst

consequences. This concept of a Covenant between God and His people survived through the Puritan epoch three hundred years ago. It is interesting to note, as Scott Buchanan[7] points out, that "social contracts" then "took the place of covenants with God." In this we are moving toward the French Revolution and the radical upheavals of the present era.

It is not easy to date the beginnings of our own decline and fall. The late Richard Weaver[8] insisted that it was back in the fourteenth century when Western man, like Macbeth, met the "witches on the heath." Those who rate civilization strictly in terms of horse power and gadgets may see no problem, but when we recall that we have seen atrocities in our own time that make the horrors of the dark ages pale into insignificance, the dangers of the course we are following become apparent. Where then did we miss our way? The concept of a personal God, concerned and involved in the affairs of men and to whom men are accountable, is often said to have been a casualty of Newtonian physics with its mechanical "world view." If one dates the rise of Deism to the pronouncements of Lord Herbert[9] in 1624, Deism antedates Newton by more than a generation. In all fairness to Isaac Newton, it should be pointed out that he was devout and intended no disrespect to the Divine Lawgiver of the universe in seeking to understand the laws of motion basic to celestial mechanics. Whatever Newton's intent, his physics had a profound influence on philosophy in the ensuing years and went far in depersonalizing the universe.

This mechanical world became even more impersonal with the rise of modern geology about a century and a half ago, with Darwin's theory of evolution in biology completing the process a little later. Sir Charles Lyell,[10] following James Hutton, insisted there had never been any great catastrophes such as a universal flood and was most emphatic that whatever natural calamities there had been across the ages were not divine judgments on sinful men. He said that ". . . in a rude state of society, all great calamities are regarded by the people as judgments of God on the wickedness of man." For instance, "the submersion of the island of Atlantis under the waters of the ocean, after repeated shocks of an earthquake, . . . happened when Jupiter had seen the moral depravity of the inhabitants." Lyell thus liberated his contemporaries from what he considered the primitive notion that God punishes men for their sins. Darwin, a devoted disciple of Lyell, went even further in decreeing that there could be no meaning or purpose in this universe of ours. To understand the impact of Darwin's denial of purpose one must remember that the early nineteenth century might well be called the Age of Paley. William Paley had seen evidence of immense design in our world and had argued that design presupposes an Infinite Designer. The scientists of his time were caught up in this quest for proof that "all things work together for good" in a creation harmoniously engineered by the Supreme Architect of heaven and earth. Darwin[11] was most emphatic: he said his contemporaries "believe that many structures have been created for the sake of beauty, to delight man or the Creator. . . . Such doctrines, if true, would be absolutely fatal to my theory." He even discussed the flowers and the birds, but decided that their beauty or the songs of the birds have no higher purpose or meaning than mere survival —a view certainly less romantic than Emerson's[12] ". . . if eyes were made for seeing, Then Beauty is its own excuse for being." In conclusion, let us summarize the philosophical import of these two centuries from Deism to Darwinism: the Creator was first relegated to the position of absentee Landlord of His creation; it was later decided that we could also dispense with His services as First Cause and Designer of this universe as well as Supreme Judge. God was no longer necessary.

Relativism and Ruin

The sequel of these two centuries of philosophical "evolution" is most fascinating and, of course, brings us down to the present hour. The rigid, mechanical legalism of the Deists with their devotion to the physical laws of the universe soon gave way to the relativism of the modern period. Whatever the thinking of Einstein and Heisenberg may mean to the physicist, they still build bridges, battleships, skyscrapers and jet planes according to traditional mechanical principles and even launch Sputniks in terms of Newtonian physics. But in the realm of social science the victory of relativism has been wellnigh complete. Whole academic disciplines have been built on the assumption that there is no truth and there are no abiding principles, that God and His Word simply do not matter. "The proper study of mankind" is legitimate but beset with many pitfalls.

While there has been considerable excitement at times over the last century about monkeys in cocoanut trees, the larger implications of the modern secular "world view" have been almost completely overlooked by Christian scholars including the professors in our church-related colleges, presumably the last intellectual strongholds of the faith; having been educated and "brainwashed" in the state universities, our Christian teachers often fail to see the conflict between the academic disciplines they teach all week and the creeds they profess on Sunday. While I am not urging the abolition of secular learning, our blindness is tragic. As one of many possible examples, may I mention that one will search in vain through psychology and sociology books nearly as big as the Sears and Roebuck catalog for one mention of the fact of sin. Surely, if these subjects claim to be a study of human behavior, this is more than a minor omission. Still the psychologists and sociologists with their faulty view of man are in the forefront of the secular attempt to save the world. Furthermore, the triumph of this relativisitic, naturalistic, pragmatic philosophy has been a landslide, overwhelming every area of human thought and endeavor. For instance, former Chief Justice Vinson[13] rendered the decision in 1951: "Nothing is more certain in mod-

ern society than the principle that there are no absolutes . . . all concepts are relative"—in other words, there are no abiding principles, no eternal Truths that were true when the Creator flung the stars into space and will still be true when this world is on fire. We have come a long way in the two centuries since Blackstone declared that the laws of men should conform to the Higher Law, "dictated by God Himself." The world has rejected God's Law and we have forgotten it. Those who would insist that I have overstated my case need only recall Julian Huxley's[14] remark of a few years ago:

> The advance of natural science, logic and psychology has brought us to a stage at which God is no longer a useful hypothesis . . . a faint trace of God still broods over the world like the smile of a cosmic Cheshire cat. But the growth of psychological knowledge will rub even that from the universe.

We are living in the post-Christian era, we are told. Little wonder that our civilization is rapidly being reduced to chaos and mass liquidations of human beings, created in the image of God, have become a commonplace.

Faith in a Living God

Still this is no time for us to become discouraged, although I suspect things may get worse, much worse, before they get better. Nevertheless, God is still on the throne. Those who know their history cannot help but be aware how dark the night has often been before the dawning of a new day of hope. Perhaps the beginnings of a New Reformation are already upon us. One may wonder if this "God-is-dead" controversy may not yet work out for His glory in that it brings a lot of issues out into the open: it at long last helps us see where our philosophical paths have been leading us over the last few centuries. Furthermore the bankruptcy of modern man's efforts to save himself are becoming increasingly apparent, most obviously in the colossal failure of the godless gospel of salvation according to Marx but no less so in other humanistic attempts to redeem mankind which may not have been so blatantly and offensively anti-God, although their basic assumptions were very much the same. Man must see his own abysmal failure and utter lostness before he feels his need of God once more. This he is increasingly aware of, although he seems not even yet to see the appropriate remedy, perhaps because of our own failure. Can it be if we could just turn the primitive Church, the Church of Peter and Paul, loose on our perverted world that they could turn it right side up once more? The Lord is still able—are we?

But we must realize that it will take much more than a little religious excitement—a revival in the very narrow sense as urgently as this is needed—to meet the needs of the world in this hour of global crisis. To those who would lament that we are living in the "last days" and that all is lost, may I say that our task is to "occupy till He comes"; our defeatism tends to bring defeat, for thinking so helps to make it so. Many times before down across the ages an insignificant minority with God's help have won the victory. It may yet be so. The task today is enormous because man has totally lost his way—spiritually, morally, intellectually. The "Christian World View" that Western man once took for granted has been shattered by several centuries of atheistic philosophizing and even we who should have been a saving leaven have largely forgotten our own great heritage. We as evangelicals need desperately to catch on our "homework"—there is a Christian point of view which follows most logically from the creeds we profess, if we would but take them seriously enough to investigate the practical outworkings of our own beliefs. Our own philosophical failures have left an intellectual vacuum. Consequently the Church of today, feeling the urgent need to "get involved" once more, is seriously lacking any sense of direction.

Fortunately, present conditions seem to favor a renaissance of Christian thinking in every dimension of life. The failures of the arrogant attempts of men to dispense with God and His Word, and to work out their own salvation without the help of a Higher Power, are multiplying. A number could be cited but two must suffice because of space. One is the dramatic collapse of Wellhausen's "higher criticism," once the standard and "orthodox" view of the liberal theologian. For this heartwarming story see Herman Wouk's[15] *This is My God.* Wouk is Jewish and, of course, would not agree with me on several points of theology but his book makes fascinating reading, particularly the brief section on Wellhausen. Another development that is of interest is a rebirth of concern for that Higher Law, "dictated by God Himself." There is a growing literature in this field. As I write I have before me a legal work, *The Natural Law Reader,* edited by Brendan F. Brown,[16] a professor of law. He tells us on the dust jacket of the book: "Today a great resurgence of natural law thinking is taking place throughout the world, largely due to the frightful consequences of its rejection in Nazi and Communist countries." These and other encouraging signs may be only a cloud the "size of a man's hand," but I see in them great promise, if we will clear our minds and let our hearts be "strangely warmed" like Wesley before he went out to preach a message that saved England and the world in another dark hour in human history. God lives and is still able to meet our need in this hour of global crisis.

FOOTNOTES:

1. Lincoln Barnett, "God and the American People," *Reader's Digest,* (Jan., 1949), pp. 33-38.
2. Otto Butz, (editor), *The Unsilent Generation,* "An Anonymous Symposium in Which Eleven College Seniors Look at Themselves and Their World," (New York: Rinehart and Co., 1958), p. 26.
3. John Palfrey, "History of New England," in *Christian History of the Constitution Vol. I,* compiled by Verna M. Hall (San Francisco: American Christian Constitution Press, 1960), p. 48.
4. C. E. Robinson, Hellas, *A Short History of Ancient Greece* (Boston: Beacon Press, 1948), p. 100.
5. William Blackstone, *Commentaries on the Laws of England* Vol. I (Lewis's edition, 1902), p. 31; quoted also by Hall (op. cit.), p. 142.
6. Walter Terence Stace, "Values as Natural, Objective and Universal," in *Crucial Issues in Education,* edited by Ehlers and Lee (New York: Holt-Dryden, 1959), pp. 163-167.

(*Continued on page* 128)

FROM THE CONTRIBUTING EDITORS:

Religious Values in the Vocation of Science

RUSSELL HEDDENDORF, Sociology

The present concern in ASA over the proper relationship of the Christian scientist to his discipline is a question which is deeply rooted in the sociology of science. Indeed, the problem is not unique, since it is a product of the tension which has always existed between the religious commitment and the secularization of the world.

Probably no one social scientist has attempted to balance these two forces more thoroughly than Max Weber. In his opinion, the struggle must ultimately come down to the scientist himself. Only with a clear understanding of the nature of the world and the uniqueness of the scientific endeavor can the individual adequately perceive his responsibility. It is in the demands imposed upon the scientist by nature of his vocation, then, that the tension finds its greatest expression.

While not a believer, Weber approached his analysis of society with presuppositions which are thoroughly acceptable to the Christian. Of fundamental importance is his contention that the present world has become disenchanted through the process of rationalization and intellectualization.[1] These conditions, however, do not provide increased meaning or understanding of the conditions of life. Rather, there is the implication that one can, in principle, master all things by calculation "in such a disenchanted environment".[2]

In such a world, science, of course, is preeminent, since it provides the means by which such potential influence on the world is possible. For this reason, the chief value of science is technical; it is to be engaged in for its own sake. There is no question that science is useful, for it supplies answers to fundamental questions concerning man's world. What is always critically absent, however, is any understanding of the importance of such questions. In Weber's view, science is incapable of demonstrating that the world it describes has any meaning since it doesn't raise the relevant questions. While science may keep a person from dying, it is unable to determine when a person should die.

It is precisely because science is limited in its objectives that it lacks any meaning other than that which is provided by a disenchanted world. "Scientific work is chained to the course of progress" which destines it to be surpassed by some future work of science.[3] For this reason, the vocation of science lacks the potential to provide fulfillment for the scientist because its product is antiquated by subsequent discoveries.

Nevertheless, the vocation of science has a compulsion for the individual. He must specialize if he is to accomplish anything noteworthy in his field, even if it should be of only temporary value. Certainly there is a passion which is unique to the scientist. Lacking such a passion, a scientist's endeavors will not reach complete fruition. Yet, while the passion for science may make the person a better scientist, it will not prepare him for life in a disenchanted world. Nor will his science alone provide the meaningful interpretation of the world which he needs.

It is at this point that religion and science begin to reach a synthesis. Theology stands over against science in its contention that the world does have meaning which must be interpreted.[4] Further, one cannot rely upon science alone for a scientific understanding of the world, since "the various value spheres of the world stand in irreconcilable conflict with each other".[5] As the scientist arrives at new "facts" which may be inconsistent with the value system of science, he is forced to raise new questions which may be personally inconvenient.

While science can provide possible explanations, it may be the religious question which is more critical. Since no science can be without values or presuppositions, it is precisely the religious question which will direct the scientist into new paths of research. For this reason, it is vital that the scientist maintain value systems in approaching his endeavors. Further, the scientist will inevitably bring his "intellectual sacrifice" in order to find the meaning in the world which is denied him by his science.[6] Far better, in Weber's eyes, to accept "such an intellectual sacrifice in favor of an unconditional religious devotion," than to sacrifice one's intellectual integrity because he is unable to clarify one's position on the meaning of the world.[7] Thus, if the scientific view is to be compromised for lack of understanding of the world, it is better to accept a religious position which will provide some meaning than to revert to a pseudo-intellectual or scientific argument devoid of integrity or responsibility.

These arguments, as presented and implied by Weber, would suggest that the Christian scientist must be careful to give balanced attention to his two worlds of responsibility. His religious convictions will ultimately provide the meaning which his science robs from him. Further, his science will be enriched as he brings the uniqueness of his religious values to bear on the scientific question. Nevertheless, as a scientist he is obligated to face the reality of the disenchanted world in which he lives. To do less than this, is to ignore the responsibility which is his as a man, as well as a scientist. In this way, then, Weber brings the merger of religion and science down to the level of the vocation itself. It is in the responsible fulfillment of both his religious and scientific value systems that the scientist brings forth the fullest expression of himself as a man.

NOTES

[1]Max Weber, *From Max Weber: Essay in Sociology*, trans. and ed. H. H. Gerth and C. Wright Mills (New York: Oxford University Press, 1946), p. 155

[2]*Ibid.*, p. 139

[3]*Ibid.*, p. 138

[4]*Ibid.*, p. 153

[5]*Ibid.*, p. 147

[6]*Ibid.*, p. 155

[7]*Ibid.*

Biological Evolution

RUSSELL MAATMAN, Chemistry

The present attitude in the ASA towards the idea of biological evolution seems to be one of live-and-let-live. It is quite frequently suggested that ASA members can and should work towards the solution of many other science-faith questions, in spite of any disagreement concerning evolution.

There are two difficulties with this idea. The first concerns our use of the Bible. Many in the ASA have used the Bible in an attempt to prove that biological evolution did not occur. Those accepting evolution have responded that the Bible cannot be used in this way. Each group has thus established for itself a precedent concerning the use of the Bible. If evolutionists and anti-evolutionists cannot agree on the relevancy of the Bible for this question, neither will they be able to agree on its relevancy for other science-faith questions.

For example, the current discussion of the relation between our modern ideas of mental diseases and demon possession recorded in the Bible requires that we understand the nature of the Bible. Similarly, modern psychological conclusions may or may not be related to the Biblical concept of "soul", depending upon the nature of the Bible.

The other difficulty with putting aside the question of evolution arises because evolution is an ordering principle. It is in man's nature to seek out ordering principles, laws which are universally valid. Evolutionary theory is the result of one attempt to formulate a universal law. It is therefore natural that the idea of biological evolution has been extrapolated in two directions: into the past, before life existed, with the idea that life evolved from non-life and that non-living matter has always been evolving, without beginning; and into the future, with the idea that man and his institutions will continue to develop, producing eventually a human society entirely different from the present one.

In opposing this ordering principle, the anti-evolutionist in the ASA has attempted, using the Bible, to present another ordering principle, one which emphasizes the relation of God to his creation. For both the evolutionist and the anti-evolutionist, his ordering principle depends ultimately upon his conception of the nature of the Bible.

Because ordering principles are involved, the debate over evolution is inevitably a debate concerning a world-and-life view. But one's world-and-life view will determine the approach he uses in solving problems, including the science-faith problems discussed in the ASA. For example, the anti-evolutionist holds that all men are qualitatively different from animals. The evolutionist allows for differences between groups of men, depending upon how far along the evolutionary path each group has traveled. The anti-evolutionist opposes racism partly because he believes evolution did not occur, while the belief of the evolutionist leaves the door open for the racist. Therefore, when both the evolutionist and the anti-evolutionist oppose racism, at least some of their reasons for doing so will be different.

The question of whether or not the ASA should publish both evolutionary and anti-evolutionary literature has been raised. It is impossible that *both* the evolutionary and the anti-evolutionary positions are true. To the extent that we proceed using the wrong position—related as it is to our world-and-life view—we will obtain more wrong answers. If half of what we publish assumes evolution to be true and half assumes the opposite, then (to oversimplify, of course) our wrong answers will cancel out our right ones.

What about dialogue with our non-Christian colleagues? Both the evolutionists and the anti-evolutionists in the ASA should realize that we are *certain* to make many serious mistakes in our witness if we are divided on the evolution question. *Somebody* will be not only ineffective as a witness, but he will do positive harm. The work of the Roman Catholic Church provides an analogy. We Protestants believe that the Catholic Church teaches both error and Christian truth. We do not share in the work of this church because we do not wish to take part in a witness which contains much which we do not approve. Will the ASA present a witness which partially contradicts itself?

The ASA needs to return to the basic question about the use of the Bible in scientific problems. If we together arrive at the correct answer to *this* question, we will be well on our way towards providing a unified, powerful witness. Naturally, achieving unity will not be easy. Perhaps JASA articles and convention papers on the role of the Bible in scientific investigation should be encouraged. If we have the will to attack this question, we will very likely find suitable ways to attack it.

It seems to me that the ASA experience teaches us what it is we must be agreed upon to enable us to work and witness together. Over the years we have discussed at length what our statement of belief ought to be. Even though it may be desirable for such a statement to be short, it should be precise and it should speak to the problems which have arisen in our experience. I believe that one question our statement should answer is, "What is the relation between the Bible and science?" We should answer this question so clearly that in every science-faith discussion among us in the future the *same* basic assumption about the relation between the Bible and science can be made.

Thinkers Thought on Religion and Science

IRVING W. KNOBLOCH, Biology

Since there is "nothing new under the sun" and since we all attain our philosophy of life by means of our senses, it would seem appropriate to quote what others have said about various aspects of concern to the members of our group. Because some prominent figure has expressed an opinion upon some topic, it should not be automatically assumed that the speaker or writer has exactly the right idea. We naturally will

gladly accept those opinions which coincide with ours but one should read adverse opinions slowly to see if something useful is not offered.*

"The great minds of science know physics deeply enough to perceive the need for metaphysics. But the great minds of science are few and they are reticent people. Meanwhile the air is vocal with the noise of the hangers-on, the laboratory technicians, the merely engineers and the cocky young instructors." Bernard I. Bell *in Beyond Agnosticism.*

"Religion, like science, should accept the fact that it is necessarily imperfect, yet perfectible. The conflicts are not between science and religion but between science and theology." George Sarton *in Science, Religion and Reality.*

"There are many, and in all lands, who insist upon maintaining a reasonable faith and in challenging both the omnicompetence of scientific materialism and the inerrancy of religious authorities." Charles Raven *in Natural Religion and Christian Theology.*

"Science will never renounce the attempt to bring everything under a single system of laws. Science must be monistic, for under any other dispensation science could not exist. The dualism of nature and super-nature is intolerable to science." Dean Inge *in Dingle's Science and Human Experience.*

"Science and religion cannot be separated because (1) scientists are sometimes Christians and vice versa, and (2) it invites science to discover new things and gradually take over the field of religion. God is in and through science—science must be a religious activity—science is one aspect of God's presence. It is a mistake to say that science has no presuppositions and Christianity is loaded with them. Some presuppositions in science are honesty, integrity, hope, enthusiasm, humility, singleness of mind, co-operation, patience and judgment. The splendour and power of science reveals the splendour and power of God." C. A. Coulson *in Science and Christian Belief.*

"Just as religious leaders omit to tell their adherents about the difficult points of the Bible, so evolutionists omit the difficulties of the theory." Irving W. Knobloch.

"It is a fact, the significance of which cannot be exaggerated, that the measure of the civilization which any nation has attained is the extent to which it has curtailed the power of institutionalized religion. Those people who are wholly under the sway of the priesthood such as the Tibetans, Koreans, Siamese and Caribbeans, are peoples among whom the intellectual life does not exist." Upton Sinclair *in The Profits of Religion.*

"Lutherans have run away from intellectual issues, fearing a loss of their faith. The parochial system (school) takes our children out of life and prepares them for the next, another run away attitude. Those sects who have parochial schools have (or should) lose their influence in public instruction." Carl H. Gross *in Our Church in the Academic Community.*

"We have described scientific knowledge as dependent on rational, empirical confirmation in contrast to the existential validity of religious truth. We have suggested that while scientific truth deals with things and is therefore relatively certain, it is also relatively lacking in significance and is highly partial in nature. Religious truth, on the other hand, is relatively uncertain but it is of the greatest significance to man for it deals with his ultimate concerns or values—it attempts to come to grips with the totality of life." Joseph R. Royce *in The Search for Meaning.* (Amer. Sci. 47: 515-535,1959.)

"What we need is not so much an open mind but an attitude of distrust toward our own ideas." Rudolph Flesch *in The Art of Clear Thinking.*

"Opinion, even if wrong, may stimulate thought." John S. Mill *in On the Liberty of Thought and Discussion.*

"The absolute miracle of God's providential care nevertheless remains, though the evidence against it is overwhelming; for every instance of providential care, there is a negative one." Martin Heinecken in *God in the Space Age.*

*Some passages have been slightly paraphrased.

The Christian College: Its Tasks and Opportunities

By LARS I. GRANBERG*

Our bent as a nation is toward the immediate and the "practical." Education is seen by many simply as job training. Trained technicians keep our highly technological society in motion. But any society soon becomes obsolete if its educational institutions produce only technicians. The church, the community, the nation, and the developing community of nations demand leadership. They demand people sensitive to shortcomings, capable of dreaming big dreams (for "where there is no vision, the people perish"), and possessed of the courage, dedication, and self-sacrifice to see to it these dreams become reality.

Such leadership for church and world calls for people who can rise above the moment, people who can rise above their specific task, people whose moral perspectives rise above cultural mores. It is precisely the goal of the liberal arts to help students develop these qualities. Not skills but qualities of person are the goals of the liberal arts.

A liberal arts program differs radically from any program which aims at a specific vocational goal. The desired fruit of a liberal education is a person who thinks logically, who expresses himself with grace and precision in his speech and his writing, who discriminates the beautiful from the ugly and the fresh and creative from the banal.

The liberal arts do not assume these processes develop in a vacuum, but that they require information, exercise, and norms: the record of the successes and

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the failures, the wisdom and the foolishness, the nobility and the knavery, the beauty and the ugliness of mankind—the record of man's efforts to come to terms with the meaning of his life and to form a just and productive society. The student of the liberal arts must be taught to find a vantage point from which he can apply historical and moral norms both to his society and to his times.

It is the central place of norms in responsible living that makes clear the pivotal contribution of the liberal arts college committed to the Christian faith. The Christian faith gives liberal education a view of God, man, nature, and history. Christianity provides the liberal arts with an ultimate norm, a living example of man at his best, a motive and a pervasive sense of vocation which can make plowing as sacred as preaching and the mason serving God as completely as the missionary.

To some this will sound visionary and impractical. Not so. It is, in fact, the most practical approach to education. Northwestern is not indifferent to training in marketable skills. But as a liberal arts college it recognizes with the wise of all ages that man is far more than one who works, and that he needs more than facts and skills even to do well at his work.

"Probably the most important task of any college is to discover able teachers in sufficient number . . ." As the Danforth study (*Church Sponsored Higher Education*) points out, "If a college intends to be a Christian community and to conduct its work within a Christian context, the appointment of faculty members who are sympathetic with this purpose and can make a contribution to such a community is an important factor in [faculty] selection."

To be a *college* in any meaningful sense means we have as teachers those who are learned in an academic discipline, those whose professional training is recognized as adequate for this task by the academic community. To be a *Christian* college means that we must search for competently trained people who share with us a commitment to the Lordship of Christ over all human life and endeavor and to the authority of Holy Scripture. To find enough of such people is, at best, a difficult undertaking.

The Danforth study quotes a faculty member from one of our Reformed Church colleges on this score:

"There is a particular breed of teacher who will want to make sacrifices to teach in such an institution. They are the teachers who want to teach first and publish second if at all; teachers who see their role as comprehending, synthesizing, communicating the elements of their discipline rather than adding bits and pieces to it. These are also teachers who themselves hold to a religious philosophy of life. *The basic problem facing religion in higher education today is keeping these people in the small, church-related colleges.* The opportunities for greater financial reward, wider community recognition, and *a better situation for personal intellectual development* in the universities are making these teachers, particularly the younger ones, more acutely aware of their sacrifice. (p. 162f., italics mine.)"

Let it be clearly understood that what is needed is not so much a matter of particular labels or specialties as one of attitude. What we need at every point in our curriculum are people with the liberal arts spirit, people who are interested in the intellectual foundations of their disciplines. For this is the work of an educated man. It is also the realm of common discourse between specialties. C. P. Snow, in his book *The Two Cultures*, speaks of one culture dominated by the scientific mode of discourse, the other by the humanistic mode of discourse. Where this is the case it is because the educative process has been reduced to specialist training—a process guaranteed to fragment our culture. This is what we exist to prevent.

Whatever else it does, a college should help its students to develop personal standards of excellence. They must be helped to grasp the difference between excellence and mediocrity in music, art, and literature. They must be able to recognize when they are writing poorly or reasoning speciously. The entire campus climate contributes to this, hence the need for an augmented lecture and artist series and for more opportunities for serious conversation between faculty and students. But the principal instrument is the curriculum and a sound long-range plan for academic development.

Worship must be at the center of our lives here, for we are a Christian community dedicated to learning and to teaching. We are the expression of the mission of the Church in higher education. Since the besetting sin of the academic community is the gnostic arrogance that so easily arises from having special knowledge and a special vocabulary that easily awes the non-specialist, we need to assemble for worship. For then our perspective can be restored. We are helped to remember that as our knowledge grows so does mystery.

Once again I beg your indulgence as I mount my soap box. The principal spiritual note on the campus is not skepticism. It is indifference—not a hostile, negative indifference but a complacent, rather positively toned indifference. In effect, "I'm for it, but so what? Isn't everybody?" Most of our young people do not know what it is like not to know Jesus Christ. They do not know what it is like to lack the support and fellowship of the Christian community. The result is a kind of bland, detached consent to the Christian faith —"neither hot nor cold." There is drifting along as "God's grandchildren," banking on a godly heritage and certain cultural practices to see them through.

To be sure, many among our students are devoted to Christ. Some, no doubt, are doubtful. A few may be skeptical. We must be concerned with each of these groups and those in between. Our task is, first, to present to our students an adult version of the Christian faith. This must come from the Department of Religion —which must be among the most academically challenging on our campus—from the chapel platform and from the Christian maturity that radiates from our faculty as they set about to teach well in their field of proficiency.

Our second task is to create a climate in which the young person is helped to move his faith from a mere

cultural pattern to a personal commitment. Like the Psalmist, the student must be encouraged to "inquire in His temple," i.e., to face his questions, raise them openly and discuss them freely. Where is there a better place to do this than in the Christian academic community?

Finally, no student should hear the attacks on the Christian faith for the first time when he reaches graduate school, the business world, or the military service. This is bewildering and, too often, embittering. The feeling arises that one's church and Christian college were afraid of these criticisms or had no answers that could stand scrutiny. God is not insecure. Neither should those who consider themselves his children be insecure. He has promised that his word shall withstand all onslaughts.

As a Christian college, then, we must listen to criticisms of our faith and conduct, learning to sift the wheat from the chaff. Students must learn to recognize the premises from which criticisms are launched to evaluate these premises and to compare these with Christian presuppositions. In this way our graduates leave us well armed to deal with skeptical or hostile viewpoints.

LETTERS TO THE EDITOR

Bube, Horner and Berkhout

During the last three days, I have found myself in bed with a temperature and a little flu, but enough energy to read some of the latest issues of the Journal of the American Scientific Affiliation. Among these were President Bube's articles in the March, 1968, Journal and the two articles on evolution in the December 1967 Journal by Horner and Berkhout. In addition, various remarks in the American Scientific Affiliation News of March 1968 gave me further food for thought.

First of all, I would like to mention agreement with much of what Professor Bube says in his articles and remarks concerning the fact that we are unknown as an organization and the Council's decision to hold our meetings on secular campuses certainly meets with my approval. Secondly, the suggestion that the Affiliation should sponsor more books again meets with my enthusiastic approval, although I do not think that we have solved the question of how to choose which books.

There is one point though, over which I disagree with Professor Bube. The implication of some of the remarks is that the battle about evolution is over, and Peter Berkhout gives the impression that every responsible person believes now in evolution. In answer to the first, I would like to say that the battle is not over. Each generation is presented with athiestic mechanism and it needs to have some books which give alternatives. My medical colleague here on the mission field asked me whether I had any information or books which I could give to his sons about the problem of evolution, just two years ago. Last year when I was home on furlough many young people at the churches in which I spoke about the North Africa Mission, would ask me what I thought about evolution. Obviously they asked me because I was a doctor, and therefore in their eyes a scientific man. Naturally we have to define evolution in our talk and I think that the article by George R. Horner was very good. He talked of speciation, phyletic and quantum evolution. Then he made clear that the first two kinds do happen, but so far the third kind has not been demonstrated.

Doctor Harold Hartzler, who is getting a copy of this letter will remember that at the 1966 Annual Convention at North Park College, I made a motion that we should produce and publish a new book, which could fill the gap left by the "Modern Science and Christian Faith" which is now out of print. I cemented my motion with an infinitesimal gift of $25 but I would like to mention that the motion was approved with much enthusiasm by those present at that particular meeting. I know perfectly well that ten minute's enthusiasm does not get the book written. But I still think that we must do it.

I would like to suggest, though, a new organization of the book, perhaps in the following sequence. The first chapter should contain a summary of the Gospel, presenting its meaning and then be filled out with some of the geological material agreeing with the New Testament, such as is found in the book—"Are the New Testament documents reliable"—and other books. The second chapter should be on archaeological proofs of the events of the Old Testament. The third chapter should be on the Prophecies and the statistical probabilities of those prophecies being fulfilled by luck. There was a book put out by the Moody Press in paperback which had much of this information. I gave it away to somebody and I have never been able to get another copy. Maybe one of you would know it and be able to tell me the name so that I could order some more. A fourth chapter might be by a sociologist, or a psychologist, about conversion experiences in religion and how they have really changed people, with some testimonies both from America and from the mission field. Then the next chapter should be a philosophical type of discussion perhaps, in which the point is clearly made that because of all these facts, we consider the Bible to be reliable data and any theory of the formation of the world, or the development of man must agree with the data in this book. While I do not agree with Peter Berkhout's seeming capitulation to the word "evolution" I think that his stress on the Bible of nature would have a very real place in such a chapter, and certainly the point would want to be heavily made that if a fact

is found to be true in nature, it is just as true as a fact in the Bible, and that we must then see whether the Bible needs further interpretation. Then to have chapters on the formation of the Solar system, the age of man, etc. Horner's article seems to me to be quite acceptable as it stands, although he might wish to make it somewhat longer. I always thought that the chapter on "Mutations, Genetics, and Heredity" in the book "Modern Science and Christian Faith" was one of the best chapters in the book. As far as my information is concerned I would understand that most of this material is still valid, but in any case, a chapter of this nature. Perhaps one should have a chapter by a person, who believes in cataclysmic geology. One of the chapters must deal straightforwardly with the fact that these new ages for man can not be reconciled with the First chapter of Genesis as they stand. And the chapter should bring out the possibilities that have been presented in several of the articles in the Journal. One was that Adam was the first man that could speak, then he went out and intermarried with the sons of men.

Obviously we should not print a book which claims that we have all the answers when we don't have them, but a book is urgently needed, which gives the great amount of evidence to support a Creator, Who loves us and has rules and a life for us. It may even be that there should be a chapter which discuses D.N.A., and the new experiments concerning life. The articles that are published are always written as though putting a little methane and other things together and running electricity through them, and then coming out with amino-acids proves how everything just happened by itself. But it always seems to me that it proves that the plan to make life and amino-acids must even be built right into the atomic structure. Again in evidence for the Creator. Obviously this is philosophizing but a little philosophizing on our side never hurt. I hope that we will yet get a book out of all this.

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Darwinism & Contemporary Thought
A Review

Because readers of the *American Scientific Affiliation* would be interested in an article on "Darwinism and Contemporary Thought" which appeared last year in *Christianity Today*, I wish to give my reaction to it.[1]

The author, a Professor of Pharmacology at the University of Illinois Medical Center, is first of all concerned with theories of the chemical origin of life, their derivation from the thought of Charles Darwin (1809-1882), and the degree to which modern science has repudiated the "Darwinian postulates". The author mistakenly attributes to Darwin the view that life originally may have been generated spontaneously from non-living matter. The author argues that "Darwin, when he formulated his theories of the origin of life . . .", assumed that order arose automatically out of chaos. Secondly, the author calls for a "return to creationism as an increasingly valid scientific stance". He does so because he mistakenly thinks that Darwin ascribed conscious purpose to inanimate nature, and that the Darwinian position as derived from *The Origin of Species* in fact requires the assumption of a self-sufficient inanimate nature. Furthermore, he holds that the process of natural selection that Darwin described, acting in a self-regulating system, has become in modern thought a substitute for divine providence.

This article is therefore as puzzling to biologists as it can only be misleading to non-biologists. For it attributes to Darwin views he never held, and it denies to Darwin views that are clearly expressed in the *Origin*. Darwin denied those views the author thinks he held, and he clearly expressed views the author thinks he didn't hold. The author unfortunately associates theological and metaphysical implications with the doctrine of evolution that were neither intended nor implied by anything Darwin ever wrote.[2] The article thus shows a basic misconception about *The Origin of Species*. It is therefore important to be clear on just what it was Darwin said in his famous book. And we should also be clear on what he did *not* say, quite apart from whether we are comfortable with him or not.

What did Darwin say about the "origin of life"? There is not a sentence anywhere in any of the six editions of *The Origin of Species* in which he advanced a "theory" concerning the origin of life, as distinguished from the origin of species.[3] Nowhere did Darwin take up the question of whether his conception of natural selection may extend also into the realm of the inorganic, or the transition from the inorganic to the organic. Once only did he approach the question: on page 484 of the last chapter of the first edition, we find, ". . . probably all the organic beings which have ever lived on this earth have descended from some one primordial form, into which life was first breathed". In the second and succeeding editions he finished the last sentence of his book by saying that "life . . . having been originally breathed by the Creator into a few forms or into one . . ."[4]

Certainly these two passages do not make a theory. Furthermore, they do not support the author's conclusion that, to use the author's own words, "Darwin could therefore assume . . . that life did arise spontaneously". For if the first "life" were introduced from the outside by the Creator, as Darwin here claimed it did, it could scarcely have arisen "spontaneously" in the sense in which the author uses that adverb. Darwin thus took no position on the origin of life, beyond declaring the action of the Creator in this event. Indeed, he could not, for organic chemistry had not developed sufficiently in his day to support any particular theory on chemical origins. Furthermore, whether molecules acted in such and such a way is a question quite independent of whether Darwin said they did or did not. Besides these two brief allusions in the *Origin*, I believe there

are only two other passages in Darwin's writings in which he mentioned the chemical origin of life; in both passages, appearing in letters toward the end of his life, he remained skeptical[5].

What did Darwin say about "creationism"? Although *The Origin of Species* certainly may be considered as an argument against the doctrine of "special creation", Darwin's rejection carried no dichotomy between "evolution and creation". According to this old doctrine, all species were discrete entities; they were essentially non-historical, existing as independent events since their creation *ex nihilo*, with no connection or relatedness between them, certainly not an hereditary one, save an ideal connection that existed as a "type" or eternal idea in the mind of the Creator. Naturalists viewed animals on a series of distinct taxonomic levels, each level exhibiting variations, to be sure, but existing withal independently of its neighbors. The animals occupying these levels were viewed as decreasing in worth below man—presumably the northern European variety—who perched at the apex. When grafted onto the Genesis account, this view suited the needs of a superficial piety. And this view was useful in its time: morphology and palaeontology grew up in it, and classical embryology had its start in it. But this hierarchical idealism had more in common with Aristotle's *History of Animals* and Plato's *Timaeus* than it did with the Biblical doctrine of divine creation, which views *all* animals as holy and sanctified by reason of their common, divine origin[6].

For Darwin, on the other hand, variations were all-important, not the taxonomic level. Variations meant a hereditary relatedness, rather than fluctuations of a Platonic "type" that had been created *ex nihilo* in the beginning. It is this break with the Greek *eidos* or "type" thinking of the past that is the essence of the Darwinian achievement. Darwin broke, not with the Biblical tradition *per se*, but with a philosophical view of organic nature that was falsely equated with the Biblical tradition. By natural selection, he meant, not a conscious agent that would make nature creative, not a substitute for divine providence, but a method of describing events in nature without applying to them *any* metaphysical or theological meanings. Those who were schooled on "special creation" found Darwin's approach disturbing, either because they had not read the *Origin* carefully, or because they could not understand it. Many thought that when he had figured out how populations change into species, it was as though he was saying God did not do it! So for biologists of the mid-19th century it was difficult to understand what Darwin had accomplished, given the Platonic conception of species then extant. But it should not be difficult for biologists in the middle of the 20th.

While rejecting "special creation", did Darwin also rule out divine providence? By no means . . . Nowhere in the *Origin* did he imply that " 'dead nature' has itself become creative", nor did he ascribe "creative properties to dead matter", a view the author worriedly associates with the Darwinian position. Indeed, Darwin declared the opposite. In five passages in which he referred to the Creator, plus the passages added with the second edition, mentioned above, Darwin clearly recognized the troubled feelings of those who saw in him a threat to theism. In his chapter on "Difficulties of the Theory", he observed that ". . . it has pleased the Creator . . .", and then asked, "Have we any right to assume that the Creator works by intellectual powers like that of man?" And again, ". . . as the works of the Creator are (superior) to those of man". In his fourth chapter of the second edition he took pains to show that he did not consider natural selection as an "agent" acting within nature to make it "creative". "It has been said that I spoke of natural selection as an active power or Deity; but who objects to an author speaking of the attraction of gravity . . .", he wrote. And in his last chapter he mentioned "the laws impressed on matter by the Creator"[7]. If these brief passages in context do not indicate that Darwin readily acknowledged the role of divine providence in nature, then what combination of words ought he to have used to convey this meaning?

If all that is meant by a "return to creationism" is a theological statement of divine origin and meaning, there is no difficulty. Darwin himself allowed as much on pages 186, 188, 189, 488, and 490 of the first edition, and in each of the other editions as well[8]. But it is not to my mind a strengthening of theism to entertain a return to a view of organic nature that can only resemble the hierarchical idealism of a bygone age.

It is not that the author does not take evolution seriously enough, but that he takes it *too* seriously. He needlessly thinks it inimical to theism. But evolution is essentially descriptive, not normative. There is no denial of ultimate causation, divine providence, or meaning. Evolution is no more inimical to theism than gravity, the atomic theory, DNA, or any other scientific abstraction. So, on the one hand, we do not hesitate to apply it as a model for organizing events in nature, and, on the other, we do not extoll it as a basis of faith.

C. S. Lewis has reminded us in *The Discarded Image* that "Nature has all sorts of phenomena in stock and can suit many different tastes"[9]. The doctrine of "special creation", admirably suited to its time, gave way to the evolutionary doctrine, which remains the model for our age. It may be that in some future age, a different model will emerge, according to new requirements, though surely incorporating features of the present. But we must not miss the point of Lewis' sentence: it is nature that provides the phenomena for the model, not the Bible.

REFERENCES

1. Smith, A. E. Wilder, "Darwinism and Contemporary Thought". *Christianity Today*, May 26, 1967, pp. 3-6.
2. All the main objections to Darwin were raised and answered, and answered well, in my view, much before the end of the 19th century. Two good discussions of the controversy are:
   (a) Gray, Asa, *Darwiniana*, Essays and Reviews Pertaining to Darwinism. (New York, Appleton, 1876) Cambridge, Harvard Belknap, 1963. (xxiv, 327 p.) (This

is a discussion of the American objections to Darwin.)
(b) Ellegard, Alvar, *Darwin and the General Reader,* The Reception of Darwin's Theory of Evolution in the British Periodical Press, 1859-1872. Goteberg, Acta Universitatis Gotoburgensis, 1958. Vol. 64, No. 7 (394 p.)

3. Peckham, Morse, *The Origin of Species by Charles Darwin,* a Variorum Text. Philadelphia, University of Pennsylvania, 1959. (816 p.) (This volume is useful for comparing passages in all the editions of Darwin's book.)
4. Darwin, Charles, *On The Origin of Species.* Harvard University Press, 1964. Facsimile of the first edition of 1859, with introduction by Ernst Mayr. (xxviii, ix, 502 p.) (Mayr's introduction is a lucid and balanced discussion of Darwin's impact on the biological thought of the 19th century. There are six editions of the *Origin,* if we count the two issues of the 1859; the others are 1861, 1866, 1869, and 1872.)
5. (a) De Beer, Sir Gavin, *Charles Darwin, a Scientific Biography.* New York, Doubleday, Anchor, 1965. (xx, 295 p.) Quote, p. 271. (b) Darwin, Francis, Editor, *The Life and Letters of Charles Darwin.* London, Murray, 1887. (3 vols.) Vol. 3, pp. 168-169.
6. Thus we may readily understand the recoil or revulsion among some present-day critics of Darwin from the theory that man is in the lineage of lower primates. This emotion is correctly directed, not at the Biblical view of creation, but at this ancient Greek, hierarchical view of the animal kingdom. Ideas are persistent. There should be no distress concerning our lineage if we accept the Biblical view of the holiness and sanctity of *all* life. Too, it is no accident that ideas of "white supremacy" found support in the doctrine of "special creation". Ideas have consequences. There is no such parochialism in the writings of Darwin.
7. I am not trying to read any particular religious view into these brief passages; Darwin was not a theologian. But it does seem to me that when we get into a discussion of "evolution and creation" then what Darwin actually said in print on religion ought really to count for something.
8. Darwin was a theist at the time he wrote the first edition:
   (a) Reference 5b, Vol. 1, pp. 312,313.
   (b) Darwin, Francis, Editor, *The Autobiography of Darwin and Selected Letters.* New York, Dover, 1958. (vi, 354 p.) (New York, Appleton, 1892) P. 66.
   (c) Stecher, Robert M., "The Darwin-Innes Letters. The Correspondence of an Evolutionist with his Vicar, 1848-1884". *Annals of Science,* 17, 1961, 201-258.
   But then it is irrelevant to comment on Darwin's religious views (probably Deistic in part), in order to assess the validity of his scientific views, since the behavior of populations in nature is certainly independent of anyone's religion; presumably the behavior of populations may not be expected to alter for either an atheistic or a theistic observer.
9. Lewis, Clive S., *The Discarded Image.* Cambridge, University Press, 1964. (x, 232 p.) P. 221.

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"The Biblical Flood and the Ice Epoch" by D. W. Patten

Two articles that appeared in recent issues of the ASA Journal prompt me to write this letter. The first is the excellent article by R. H. Bube in the March 1968 issue where he outlines a program of "rapprochement" between ASA members and the general scientific community. The second concerns a book entitled "The Biblical Flood & The Ice Age" by D. W. Patten reviewed by A. O. Ramsley in the December 1967 issue of the ASA Journal.

In his outline, Bube underscores the importance of high caliber scientific publications by ASA members that deal with historical or scientific reliability of the Scriptures. Needless to say, this is an issue of paramount importance to ASA's image as a legitimate scientific as well as Christian organization. Therefore, as part of ASA's high standards the organization must carefully screen biblical-scientific publications, such as the recent book by D. W. Patten, which appear on the market from time to time. A. O. Ramsley gives a comprehensive and a reasonably critical review of Patten's book but fails to mention several serious errors and misrepresentations in Patten's analysis.

A colleague of mine, Professor G. W. Gross (a reputable geophysicist) and I reviewed Patten's book entitled "The Biblical Flood & The Ice Age" for local publicity. In spite of the fact that we both accept the possibility of a global biblical flood as a legitimate historical event, we were both appalled at the superficiality of the arguments presented in the book and the obvious scientific inaccuracies in several of Mr. Patten's fundamental explanations.

We have discouraged local publicity of the book and would suggest you do the same, after reviewing our enclosed comments.

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Review

"The Biblical Flood and The Ice Epoch" is an interesting book which uses an unconventional astrophysical approach in an attempt to explain a global biblical flood. Had the book actually portrayed its intended purpose, namely to present catastrophism as a well thought-out, scientifically tenable alternative, it would have made an entertaining as well as a thought provoking reading. However, the author fails to do so for the following reasons:

In an attempt to be comprehensive and "scientific," the author undertakes the herculean task of plowing through an awesome array of scientific disciplines, such as astrophysics, geophysics, anthropology, etc., without adequate scientific training in any of these fields.

This is evident from the fact that in most of his hypotheses he fails to analyze available geological information and omits significant factors which would otherwise completely invalidate his hypotheses.

For example, the author states that the Ice Epoch was caused by millions of cubic feet of ice that fell on earth from an astral visitor over a very short period of time. However, he forgets that even a piece of ice one cubic mile in size will completely evaporate by frictional heating in the earth's atmosphere before it impacts on earth.

Furthermore, according to Professor G. W. Gross, geophysicist at New Mexico Mining Institute, who also reviewed the book, the author completely ignores the evidence on the age and different stages of glaciation based on radioactive age determinations of plant and

animal remnants, as well as on layered deposits of glacial lakes ("varves").

He also ignores the evidence on the age of geological formations obtained by the same methods. Therefore, his geological time table (pp. 302-304) is unacceptable. The overwhelming evidence is that our present picture of the geological sequence is basically correct (although it is undoubtedly wrong in many details). Geophysical age determinations may well be, and often are, in error. But if so the author has failed to prove it. As a matter of fact, the author does not so much as mention them. These methods are not based on any geological hypothesis (such as uniformitarianism), but on physical theories that are among the most solidly grounded concepts of science. (If, indeed, we accept that there is such a thing as certain knowledge; but if not, there is no reason in discussing the problem at all.)

There are no calculations to support his massive tide theory, neither does he properly investigate the consequences of a large astral visitor from considerations of orbital mechanics. The latter shows constraints imposed by Newton's law of universal gravitation on celestial bodies which makes the author's "visitor" theory highly suspect.

There is no need to go any further. It is the reviewer's opinion that this book be treated at best as *science fiction* and by no means an authentic, scholarly document because, if used and quoted indiscriminately, it will be violating one of the basic tenets of Scripture, namely, that of sticking to the truth, and can thus become a detriment to the authenticity of the Scriptures.

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P. S. Both Professor Gross and I would like to make it clear that we do accept the possibility of a global biblical flood as stated in the Scriptures.

BOOK REVIEWS

MARLIN KREIDER, Editor

FAMINE—1975! AMERICA'S DECISION: WHO WILL SURVIVE? by William Paddock and Paul Paddock. Little, Brown and Co., Boston 1967. 286 pp. $6.50.

In the 24th chapter of Matthew Jesus warned his disciples—and us—of "famines, pestilences, and earthquakes in diverse places". William and Paul Paddock somberly predict that the decade ahead will see a transition from the Jet and Atomic Ages to the Age of Food, an age in which food will be the determining factor in international power politics. As suggested by the somewhat dramatic title of the book, this calamity will be upon us by 1975, the approximate date for the beginning of the "Times of Famine". One might wonder if this is not another example of sensationalism by a pair of authors who want to sell a book. It is my opinion that: 1) the authors of this book are deadly serious, and 2) the Christian of today must look on these awesome prospects with the concern and the compassion that led our Savior to feed the multitudes, physically as well as spiritually.

William Paddock is an experienced agronomist and recognized authority in tropical agriculture. Since most of the underdeveloped countries are in the tropics, he writes from years of first hand, practical experience with the problems of food production in relation to world population. Paul Paddock has spent over twenty years in the United States Foreign Service, mostly in underdeveloped countries of Asia and the Far East.

In a carefully documented presentation, they demonstrate that the population-food collision is inevitable. None of the methods now in use or under consideration, individually or collectively, are capable of controlling world population in the *near* future. Due to the impossibility of an immediate increase in agricultural production, in proportion to the population increase, the hungry nations of today will inevitably be the starving nations of the next decade. There is *no* hope to avert this disaster. Synthetic foods, hydroponics, desalinization, the ocean, fertilizers, plant breeding, irrigation, land reform, government support, private enterprise, or any "unknown" panacea cannot possibly contribute enough *in time*. Neither can the developed nations avert the disaster. Only the United States will be able to provide any help, and our resources are totally inadequate to feed the world of 1975.

What, if anything, can be done in the light of such a grim prediction? The only solution, the authors urge, —in the name of reason, national self-interest, and true humanitarianism—is a famine-disaster version of the military medical "triage" system. The United States, in sharing its limited resources, must divide the underdeveloped nations into three categories: 1) Those so hopelessly headed for or in the grip of famine (whether because of overpopulation, agricultural insufficiency, or political ineptness) that our aid will be a waste; these "can't-be-saved nations" will be ignored and left to their fate; 2) Those who are suffering but who will stagger through without our aid, "the walking wounded"; and 3) Those who can be saved by our help. The determination of each nation's category will involve the consideration of factors such as its political stability, its progress toward self-help, its value to "the economic viability and relative prosperity of the United States" and to "the economic stability of the world as a whole". As specific examples, the authors suggest that Haiti, Egypt, and India can't be saved; Gambia and Libya will survive without our help; and Tunisia

and Pakistan should receive food.

As Americans and as scientists we may rebel at the thought that anything good will not eventually be achieved. Such a grim prediction and equally grim solution as the Paddocks offer seem remote and unreal. But, as the authors point out, even the U.S. Department of Agriculture predicts essentially the same horrifying, worldwide food catastrophe. The U.S.D.A. is more hopeful only in that they give us until 1985! The recent three volume report, *The World Food Problem*, published last year by the President's Science Advisory Committee (PSAC), reaches a similar conclusion. While maintaining that a solution is biologically, economically, and technically possible within twenty years, their report raises the "question whether the world is up to meeting the problem" *in time*.

These are not the vague predictions of sensational journalists or the date settings of an off-beat prophetic sect. These are the considered estimates of the authors and others concerned with population and food. The Paddock brothers indicate that until recently the demographers were sure the agriculturalists would come up with an answer in time. But the agriculturalists were counting on the demographers to control population and hence avert the calamity!

I see two serious questions for Christians in the predictions of the Paddock brothers. First is the question of accuracy and realism. Some demographers and agriculturalists give a more optimistic evaluation of the situation. But we have seen that both the Department of Agriculture and the President's Science Advisory Committee see a grave and ominous food-population crisis as probable by the mid 1980's. The recent (also 1967) report, *Alternatives for Balancing World Food Production and Needs*, of the Iowa State University Center for Agricultural and Economic Development has been billed as more optimistic and less extreme than either the Paddock brothers or the U.S.D.A. However, the major emphasis in the Iowa work is on what *should* be done in contrast to the Paddock's discussion of what *will* be done. As Director Earl O. Heady states in the foreword to the Iowa publication: "While the optimistic alternative is possible in attainment, the pessimistic alternative will be the outcome *if governments and world organizations do not activate vigorous policies* (italics mine) directed both at increasing food supply through agricultural development and restraining demand for food through population control." There certainly has to be some drastic changes in the attitudes and deeds of the American Congress and people, as well as the United Nations, for these goals to be met. On this basis then, I'm afraid the Paddock brothers are all too realistic and accurate.

The second question is whether the Paddock version of triage is as humanitarian and reasonable as this book implies. I, for one, cannot see us writing off India, for example, when thousands of Americans have served in India as agriculturalists, engineers, U.S. government employees, and missionaries, and thousands of Indians have received some of their education in this country. Such personal contacts have developed friendships and emotions that would not calmly allow India to be left to her fate. The same is true of other nations that might be classified as "can't-be-saved". However, if the situation is as grave as the Paddocks say, we as Christians had better adjust to the triage concept OR come up with a better solution. On the basis of the evidence in this book (and elsewhere), we cannot afford to just sit back and hope that the problem will solve itself or just fade away. Neither can we coldly shrug it off as none of our concern.

Famine–1975 is a disquieting and disturbing book. Not only does it remind us of Matthew 24, but it also sounds ominously like parts of the Revelation. Certainly, the prime mission of the church is not to promote birth control nor to develop a program of agricultural research. Most certainly, the church does not have a mission to oppose such programs. As Christians, we must, however, plan to exercise our compassion in a concern for the feeding of the physical man as well as the spiritual man. We must recognize–as most of our mission boards recognize–that it is difficult to present the Gospel effectively to millions with empty stomachs. The "Time of the Famines" is almost here. We must, for conscience sake, seriously concern ourselves with what we should do, even if, happily contrary to the predictions of this book, the actual event is not as gruesome as the Paddock brothers predict. Certainly, we ought to carefully examine ourselves to see whether American pride and affluence have subverted our Christian charity and compassion. Jesus said: "Inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me". Is it just coincidence that our Lord's plea for feeding the hungry and satisfying the thirsty appears near the end of His discourse on the end times in Matthew 24 and 25? In the light of the Paddock brothers' book, and substantiating evidence elsewhere, I doubt it. And I have become deeply convinced that we as Christians have work to do.

Reviewed by Wilbur L. Bullock, Zoology Department, University of New Hampshire, Durham, N.H.

GALILEO, SCIENCE AND THE CHURCH, by Jerome J. Langford, O. P., Desclee Company, New York, 1966. 237 pp. $5.95 cloth.

Galileo, like Darwin much later, has become a symbol of the heroic courage of science valiantly combating the ignorant dogmatism of the church. As popular myth has it, both Darwin and Galileo suffered on the rack of Biblical literalism. Genesis proclaims special creation and Joshua the movement of the sun around the earth (Joshua 10:12-13; Cf. Psalms 19:4-6; 93:1; 104:5, and Ecclesiastes 1:5). Darwin, of course, was luckier than Galileo: Protestant England had no Inquisition. But the less fortunate Galileo, so the story goes, suffered the Inquisition's torture, agonized in its dungeons, and finally recanted only to say later, "Yet it [the earth] does move!"

The Galileo legend is, of course, a gross distortion of history. Scholars have known this for a long time,

and recently popularizers (such as Arthur Koestler, in *The Sleepwalkers*) have tried to erase the myth from minds of general readers. It is true, of course, that Galileo tried unsuccessfully to keep the Church from declaring the Copernican system heretical and was later forced to abjure his own defense of Copernicus. Still, Galileo was not particularly courageous nor his antagonists particularly ignorant. Galileo had friends as well as enemies in Rome, and some of these Catholic scholars defended him openly. Galileo was, perhaps, threatened with torture, but he was never shown the instruments and never clapped in a dungeon. He never stood up to his inquirers at the trial, but (apparently despite the facts) claimed he had not taught the Copernican system. Nonetheless, forced to abjure Copernicanism, he submitted, never saying, as the myth has it, "Yet it does move!" He was under house arrest before the trial, but afterwards his prison sentence was commuted and his daughter, a Carmelite nun, was allowed to say for him the seven penitential psalms that he was required to repeat once a week for three years. Galileo was released and forbidden to write further on the Copernican system, but he was free to work on his new physics and therein made a considerable contribution. All of this has been known to scholars for years.

Father J. J. Langford, who teaches at St. Thomas College (St. Paul), is, however, concerned to dispel not only the gross distortions of the Galileo legend, but (1) to establish as much as possible the contested facts of the case, (2) to understand those facts in terms of the theology and science of Galileo's own day, and, finally, (3) to draw from the situation "a tentative theory of the relationship between science and religion" (p. xv) relevant to our own day.

With regard to the first goal, Father Langford does a commendable job. The records of Galileo's life, the letters between him and his friends and enemies, even the official documents are fogged by gaps and phrases of questionable meaning. Father Langford cuts through the fog, challenges (successfully at times) the evaluations of modern secular Galileo scholars (such as Giorgiano de Santillana, *The Crime of Galileo*), while still admitting that problems remain.

In reaching his second goal, Father Langford places the relevant facts surrounding the decree against Copernicus (1616) and the trial of Galileo (1632) in the context of seventeenth-century science and theology, clarifying both as he does so. Father Langford's discussions of papal infallibility, counter-reformation exigetical principles, and authority and proof in science and theology are especially helpful. As a result of his investigations, Father Langford neither excuses the Church's action nor makes a hero out of Galileo. Rather Galileo emerges as the victim of a "tragedy of errors." As a convinced honest Catholic, he did not doubt the Church's authority in matters of faith. Now, he was told, astronomy was a matter of faith: Copernicanism was heretical. Galileo must then choose to remain faithful to his religion or to deny it. Given such a choice, Galileo could only abjure his anti-Christian astronomy. Lamenting the result, Father Langford says, "Catholics will always be in the unfortunate position of having to admit that a court of Catholic theologians condemned a doctrine and a man, who, as it turned out were right" (p. 161).

Father Langford's third goal is to present a "tentative theory of the relationship between science and religion." Here a reader steeped in modern attempts at such *rapprochements* will find little new, After tracing the relation between science and philosophy from the seventeenth century, Father Langford defines what he takes religious faith to be: "To have religious faith is to assent to certain religious truths because they are revealed and guaranteed by God Himself" (p. 186). As far as the content of such faith is concerned, this sentence suffices: "God is the Personal Creator who sent His only Son, Jesus Christ, into the world to die and overcome death that all men might be saved through personal commitment to Christ" (p. 185). Both science and faith are autonomous; each has its realm, its methods, its goals. Still, he insists, there must be established within Christendom an understanding of their relation. So far, Father Langford feels, Teilhard de Chardin has made the most progress toward this goal.

It is somewhat difficult to give an evaluation of the book as a whole. All of it is well written and will be clear to general readers. But in the section on Galileo's life and trial, Father Langford makes a scholarly contribution of interest to specialists in the history of science and the church. Finally in his discussions of the necessity for a "theology of science," one can appreciate his goal without being convinced about the ultimate value of Teilhard's system. This final philosophic section, unlike the historical section, is simply too cursory. One suspects that at this point Father Langford speaks only to general readers. Still, the whole work remains an informative, even exciting, account of a classical skirmish between science and religion.

Reviewed by James W. Sire, Editor, Inter-Varsity Press, Downers Grove, Illinois.

(*Continued from p.* 117)

7. Scott Buchanan, *Rediscovering Natural Law* (Santa Barbara, California: Center for the Study of Democratic Institutions, 1962), p. 30.
8. Richard M. Weaver, *Ideas Have Consequences* (U. of Chicago Press, 1948), p. 2.
9. Earle E. Cairns, *Saints and Society* (Chicago: Moody Press, 1960), p. 26.
10. Sir Charles Lyell, *Principles of Geology* Vol. I. (1872 edition), p. 13.
11. Charles Darwin, *Origin of Species* (Harvard Classics, "Five Foot Shelf," 1909 edition, vol. 11), pp. 209-215.
12. Ralph Waldo Emerson, *The Rhodora: On Being Asked, Whence is the Flower?*
13. Felix Morley, *Freedom and Federalism* (Chicago: Henry Regnery Co., 1959), p. 211.
14. Frank E. Gaebelein, *Christian Education in a Democracy* (New York: Oxford U. Press, 1951), p. 112.
15. Herman Wouk, *This is My God* (Dell paperback edition), "Wellhausen Theory," pp. 252-259. Wouk's critique of Wellhausen will also be found on pages 312-320 of the hardbound edition.
16. Brendan F. Brown (editor), *The Natural Law Reader* (Dobbs Ferry, New York: Oceana Publications, 1960). This is a compilation of sources from Plato to the present, including the Church Fathers, Blackstone, and current writers. This book, although a legal work, will also be of great interest to the Christian philosopher and theologian.

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