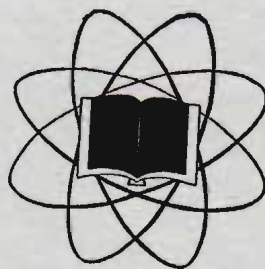


# JOURNAL

*of the*

# AMERICAN SCIENTIFIC AFFILIATION



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

Vol. 11

SEPTEMBER, 1959

No. 3

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(Incorporated)

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The Journal of the American Scientific Affiliation is published quarterly, March, June, September, and December by the American Scientific Affiliation. The publication office is located at 214-9 Halsey Drive, West Lafayette, Indiana. The subscription price is \$3.00 per year. Single copies may be obtained at a price of 75c each. Copies of back issues may be obtained at the price of \$2.00 per volume. Send all communications regarding editorial matters to the editor, Delbert N. Eggenberger, 620 Lincoln Street, Downers Grove, Illinois.

Entered as second class matter at the post office at Goshen, Ind.

# *Evidence For The Existence Of God From Science*

A Summary of a Recent Book

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It is perhaps not often enough remembered that the Scriptures teach that God has provided man with sufficient evidence of His existence in nature, that a disbelieving man can offer no excuse. "For the invisible things of him are clearly seen, being understood by the things that are made, even his eternal power and Godhead; so that they are without excuse: because that when they knew God, they glorified him not as God, neither were thankful; but became vain in their imaginations, and their foolish heart was darkened. Professing themselves to be wise, they became fools." Romans 1:20, 21.

It is one of the principal aims of the American Scientific Affiliation to bring to light exactly what constitutes these evidences of God from science. A recent book, "The Evidence of God in an Expanding Universe" (Putnam's) edited by John Clover Monsma, brings together the testimony of 40 scientists who have found that their scientific endeavor has established, at least for themselves, valid evidence for the existence of God. Many of these scientists are members of the ASA. The basic purpose of the book is adequately summed up in the introduction. "The basic postulate of this book, its point of departure, is that science can establish, by the observed facts of Nature and intellectual argumentation, that a super-human Power exists. It cannot identify that Power or describe it, except in very general terms. For identification and more detailed description special revelation (the Bible) is needed." Thus the book is on solid ground and makes a definite contribution in an area of prime interest to the ASA.

The contributors to the book are chosen from a wide variety of scientific disciplines; about 20% are from backgrounds related to physics, about 20% related to chemistry, and about 35% related to the life sciences. In addition to authors trained in physics and chemistry, contributors include men trained in biophysics, philosophy, mathematics, zoology, entomology, physiology, biochemistry, genetics, agronomy, forestry, biology, botany, geochemistry, astronomy, engineering, and medicine. All of these men are agreed that their philosophy of science and of life, apart from personal experience and religious faith, leads them to the conclusion that there is indeed a God.

In a book with 40 authors all discussing the same question, there is bound to be considerable repetition and possible obscuring of exactly what constitutes the principal evidences for the existence of God from science. It is the purpose of this paper simply to summarize these basic evidences, to provide typical examples for them as drawn from the book itself, and thus to provide a brief logical basis for this aspect of the subject.

An analysis of the book indicates that there are just five essentially different evidences offered. These then are the five evidences which leave man without excuse; if there are more that are here omitted, it is important that they be included, and likewise if there are any here which are not capable of support, they should be deleted. The five basic evidences are these:

(1) The universe is not eternal. It was created. This implies a Creator, a First Cause, whom we call God.

(2) The universe exhibits an order and evidence of law which is too great to have arisen by mere chance. Such an order and law implies a Lawgiver.

(3) The universe exhibits a beauty and usefulness of design. Such design implies a Designer.

(4) Human life is characterized by certain spiritual aspects which are beyond the realm of science. Such spiritual aspects of man imply a Spiritual source outside man.

(5) The record of the Bible, and its testimony to the existence of God, has been scientifically substantiated wherever interaction with scientific disciplines occur.

These five evidences have been listed on purpose in what seems to this author to be the order of decreasing convincing power for one who does not accept the existence of God; yet such a non-believer has no adequate logical or scientific refutation of any one of the five.

Critical evaluation of these five evidences is beyond the scope of this paper. Certainly additional analysis of the concepts of order and design particularly, beyond that which appears on the surface to be obvious, is in order in the light of modern science. It is the author's hope to be able to discuss some of these points further in the not too-distant future in a paper on the metaphysical implications of mo-



dern science.

Since the examples quoted by the authors of the book here under review form the real substance which fills out the outline of the five evidences, we shall now consider these examples as drawn from the book.

(1) *The universe is not eternal. It was created. This implies a Creator, a First Cause, whom we call God.*

(a) Of the four possible solutions to the origin of the universe: (i) it is all an illusion, (ii) it arose spontaneously out of nothing, (iii) it is eternal, and (iv) it was created, only the last is logically and scientifically defensible, as illustrated further by the following arguments.

(b) No material thing can create itself. If a universe could create itself, it would embody within itself the nature of a Creator, or of a God, and would itself be a God. The very essence of scientific inquiry is that there cannot be a "machine" (in the broad sense) without a maker.

(c) Astronomy shows that the universe came into being in a single great explosion which began about 5 billion years ago, and that the bodies which comprise the universe are still receding from that center of their origin.

(d) Physics shows that matter is ceasing to exist, that matter is being continuously transformed into energy. Thus matter is not eternal and consequently must have had a beginning.

(e) Geology makes use of the phenomenon of radioactivity to date the age of the earth at about the same as that of the universe. The very existence of radioactive materials indicates a non-eternal earth.

(f) Thermodynamics shows that the entropy of the universe is constantly increasing, i. e., that the Universe is running down until a condition is ultimately reached when all bodies will have the same low temperature. Such a condition shows that the universe cannot have existed forever.

(2) *The universe exhibits an order and evidence of law which is too great to have arisen by mere chance. Such order and law implies a Lawgiver.*

(a) The entire scientific method is based on the assumption that the scientist is dealing with an orderly universe, in which reproducibility and predictability are possible. Order and predictability in a universe without God, i. e., in the absence of rationality, is a contradiction.

(b) The order in nature is such that at least in the physical sciences, physical phenomena can be expressed in terms of mathematical laws and formulae.

(c) The laws which the scientist *discovers* have existed long before he discovered them. The laws applicable on earth are applicable through the whole universe.

(d) The principle of uniformitarianism is axio-

matic to all geology; i. e., that geological and geochemical processes which are operating now were active in the past. This is another example of how the assumption of the orderly behavior of Nature is a cornerstone of all modern science.

(e) The basic building blocks of matter, the elements are bound together in a periodic arrangement known as the Periodic Table. It is found that there is a definite periodicity of occurrence of elements possessing similar properties.

(f) Order exists also among the variety of living plants and animals. Although there are a million species of animals on earth, and although each species can be divided and subdivided into groups, each species has definite characteristics which will be found in every member of that species. There is therefore not a disorganized array of forms, but a pervading similarity of greater or less degree throughout Nature.

(g) Apparently unrelated phenomena obey similar laws. The inverse square law appears again and again: in electric attraction and repulsion, in magnetic attraction and repulsion, in gravimetric attraction.

(h) The adjustments of the earth for life are far too numerous and detailed to be accounted for by mere chance. Consider:

(i) The rotation of the earth brings about alternation of day and night;

(ii) the revolution of the earth plus the inclination of the axis to the plane of revolution, brings about the regularity of the seasons, doubling the habitable area of the earth;

(iii) the atmosphere blankets the earth against meteors, while providing the life-giving gases;

(iv) the atmosphere maintains temperature within safe limits for life;

(v) the atmosphere carries the vital supply of fresh water-vapor far inland to irrigate the land;

(vi) the soil provides minerals needed for plant and animal life;

(vii) the presence of metals near the surface of the earth makes possible the arts of civilization;

(viii) the size of the earth and its distance from the sun are both critically right for life and development.

(i) The origin of life is also too complex to be the result of mere chance. The chance that the five elements required (carbon, hydrogen, nitrogen, oxygen, and sulfur) to form a protein molecule with as many as 40,000 atoms, would assemble in this way by chance from among 92 elements randomly distributed as 1 in  $10^{160}$ . For this process to occur on earth alone would require  $10^{243}$  years. Proteins are made from long chains called amino acids; the links in the chain of quite a simple protein could be put together in  $10^{48}$  different ways; only particular combinations

however will sustain life.

(j) The unique properties of water belie their origin in mere chance;

(i) Water absorbs large quantities of oxygen at low temperatures to sustain ocean life.

(ii) Water has a maximum density at 4° C, becoming less dense as it freezes thus allowing ocean life in winter seasons.

(iii) Water has a high heat of melting and a high heat of vaporization, thus acting as an excellent shock absorber for changes in temperature.

(iv) Water is a liquid, essential for life; its counterparts in terms of equivalent molecular weight and chemical composition are gases, usually poisonous.

(v) Water has a high surface tension which aids in plant growth.

(vi) Water has a high dielectric constant which makes it the best solvent known.

(vii) Water has a high vapor pressure over a wide temperature range, and yet remains liquid over the whole range needed for life.

(k) Consideration of known scientific principles indicates that mere chance is completely inadequate to explain the whole host of origins in the physical world: the first electron, the first proton, the first atom, the first amino acids, the first protoplasm, the first seed, or the first brain, to mention but a few.

(l) The permanence of natural law is evidence of the continuing controlling influence of the original Lawgiver.

(m) In view of the orderly character of nature, the Creator of this material realm with its governing laws must have the following attributes: supreme intelligence (omniscience), power to bring it about and to keep it in operation (omnipotence), everywhere in the universe (omnipresence). These are the attributes of the God of the Bible.

(3) *The universe exhibits a beauty and usefulness of design. Such a design implies the Designer.*

(a) Design in nature transcends mere order in that design implies *purposeful* order. We have already mentioned three examples of such purposeful order in portions (h) through (j) of the previous section.

(b) Another way of looking at the Second Law of Thermodynamics mentioned under 1. (f) above is that the universe is moving from order to disorder. This means essentially that nature cannot be its own designer. Every physical transformation must be accompanied by an overall loss of design, a transfer of energy from an available to an unavailable condition. In specific localized cases, some increase in order may result, but only at the expense of greater loss of order elsewhere. The only alternative is that the highly developed order evident in nature is there because it was designed into nature at its creation.

(c) The physiologist sees in the intricacy of design and structure of the human and animal bodies strong

evidence for a Designer. The brain, for example, coordinates all muscular activities and controls the basic bodily functions such as respiration and heart beat; it contains memory; it is the seat of reason, common sense, intuition, motivation, desire, and serenity; it is able to produce aesthetic appreciation, spiritual comprehension, self-consciousness, personality development; all these are functions of the same mass of protoplasm. Add to this the chemical buffer systems of the body, the formation of antibodies to fight disease, the mysterious rhythmicity of the heart which allows it to beat even though all nerve attachments are severed.

(d) There is considerable evidence which may be interpreted to indicate that a form of *creational evolution* was the means by which the Creator and Preserver of the universe established the living creatures of this material creation. The higher the level of evolutionary development, the greater the evidence for design working through the evolutionary process. Scientific evidence indicates that mutations producing changes according to the mechanism of natural selection in evolution are not always random, but indicate the necessity of a supreme Intelligence in the designing of improvements.

(e) Animal instincts, with all of the complexity and variation involved therein, are also indications of a design in nature.

(f) The presence of design is evident in the soil. Under virgin conditions forests are perpetuated unless disturbed by man, fire, or storm. If, after the influence of man has destroyed trees and soil, and floods have menaced the land, the land is given to restoration the land responds quickly to begin the long task of rehabilitation. This is an example of many delicate balances which exist in nature giving the evidence of design for the benefit of mankind. Man's interference with these balances almost invariably leads to troubles which only nature can rectify.

(g) The forests also give evidence of the design in nature to overcome adverse conditions. When chestnut trees died to leave great holes in the forests, the hitherto minor tuliptrees grew to fill the holes so that today the chestnuts are scarcely missed.

(h) A network of design is involved in the soil-plant relationships whereby the soil is properly prepared through the systematic and regular processes of plant growth and reproduction.

(i) Design in plants is evident through a complexity which exceeds anything conceived by man, through a beauty exceeding that of any work by human artist, and through an unailing reproduction after kind, even as it is written in the first chapter of Genesis.

(j) Obligate relationships between the plant world and the animal world also give evidence of a basic design in nature. The yucca moth and the yucca plant both function in such a way as to contribute to the

perpetuation of each other. The growth of commercial figs is dependent on the existence and activity of a group of small wasps. Pollination of prison flowers, such as the common jack-in-the-pulpit, comes about through the activities of tiny flies.

(k) Like the delicate balance between the soil and the plant world mentioned under (f), so there are similar balances in the animal world. There is, for example, the history of the effects of the introduction of the European rabbit into Australia where it had no natural enemies. Only the introduction of the rabbit virus was able to check the widespread damage caused by the rabbits.

*(4) Human life is characterized by certain spiritual aspects which are beyond the realm of science. Such spiritual aspects of man imply a Spiritual Source outside man.*

(a) Experience in the natural world shows the scientist that each observable has some prior significance: e. g., fish have gills because they live in the water; mammals have lungs because they live in the air; man has eyes because light conveys visual images to him. Now, insight, rational thinking, courage, duty, faith, love, and hope are all observables among the attributes of man. Their very existence argues for the prior significance of a Spiritual Source with which man may have communion.

(b) Man differs from all other created beings in

being characterized by four non-physical attributes: the ability to think, the existence of emotions, evidence of conscience or moral judgement, and the ability to exercise will. These attributes have their root in the creation of man in the image of God.

(c) Man has in all ages and under all circumstances almost universally recognized the necessity for extrapolation beyond himself to an Intelligence greater than he; God-consciousness is part of the heritage of the race.

(d) Psychologists and doctors are coming to realize ever clearer that there is more to sickness than physical mechanisms, that true healing requires treatment not only of the physical side of man, but also of his spiritual side.

*(5) The record of the Bible, and its testimony to the existence of God, has been scientifically substantiated wherever interaction with scientific disciplines occurs.*

(a) History has substantiated the record of the Bible in the fulfillment of prophecies made long before the events themselves came to pass.

(b) Archeological findings have consistently supported the Biblical record whenever such findings have been relevant to descriptions of the Bible.

(c) The Genesis account of creation agrees in remarkable fashion with the most probable hypotheses advanced by modern astronomy and physics.

# Numerical Codes In Bible Prophecy

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Most of the apparent conflicts between modern science and the Bible have been resolved.<sup>1,2</sup> Of those remaining, some may be resolved by assuming that God has allowed certain numerical codes to be used as a key to prophecy and as evidence of divine inspiration. Many Bible commentaries<sup>3,4</sup> and concordances<sup>5</sup> contain suggestions that the numbers 3, 4, 6, 7, 10, 12, and 40, and certain combinations of these numbers may have special symbolic or cryptic significance in some Bible passages. In particular, the number seven appears to have special importance.

While the account of creation given in Genesis can be correlated with the stages in the creation of the earth and its inhabitants as revealed by scientific studies,<sup>6</sup> it seems evident from modern science that the separate acts of creation were not performed in six ordinary days.<sup>7</sup> In the following it will be shown that there is some justification for assuming that the reference to six days of work and the seventh day of rest has a symbolical meaning in addition to the correlation mentioned above.

There is no real proof that early man could not have lived the number of years attributed in Genesis 5 to the patriarchs.<sup>6</sup> However, there is apparently no archeological or paleontological evidence<sup>1</sup> that ancient man ever lived much longer than the 120 years mentioned in Genesis 6:3. A study of the sequence of numbers given in Genesis 5 for the ages of the patriarchs from Adam to Noah suggests that there may be a cryptic message in these numbers relative to God's divine plan for the history of man.

The age of the earth is about three billion years according to the evidence from radioactive rocks and other geological data.<sup>7</sup> However, the Bible is primarily concerned with the spiritual history of man which began about 4000 B. C. when the Semitic ancestors of Abraham began to "call upon the name of the Lord", the God of Creation. Modern civilization and the recorded history of man also began about 4000 B. C.<sup>8</sup> The chronology of the Old Testament as given by the genealogies, the terms of the judges and kings, and the prophecy in Daniel regarding the time of the Messiah indicates a period of about 4000 years between Adam and Christ.

According to Jamieson, Fausset and Brown<sup>3</sup> (p. 598) "The Jewish Rabbis thought, as the world was created in six days and on the *seventh* God rested, so there would be six millenary periods, followed by a sabbatical millennium. Out of seven years every seventh is the year of remission, so out of the seven thousand years of the world the seventh millenary shall be the millen-

ary of remission. A tradition in the house of Elias, A. D. 200, states that the world is to endure 6000 years; 2000 before the law, 2000 under the law, and 2000 under Messiah."

In 2 Peter 3:5-8 we read that since the creation of the earth by God the heavens and earth have been kept in store against the day of judgment and that one day is with the Lord as a thousand years, and a thousand years as one day. Similarly in the Old Testament we find statements that a thousand years in God's sight are but as yesterday when it is past (Psalm 90:4) in reference to the coming final judgment of man by his Creator.

In Revelation 6 the opening of the six seals in order appears to have some symbolical significance in connection with the history of man, the sixth seal corresponding to the epoch which includes the great tribulation and other signs mentioned in Matthew 24. The opening of the seventh seal (Rev. 8) is followed by silence in heaven for a period as a "solemn introduction to the—eternal Sabbath-rest of the people of God."<sup>3</sup> The seven trumpets which are sounded in Revelation 8-11 also appear to have a symbolical meaning, the final judgment following the sounding of the seventh trumpet. Finally, the seven last plagues which afflict mankind as the seven angels pour out the seven vials of wrath (Rev. 15-16) parallel the judgments of the seven trumpets and thus also appear to have a cryptic meaning.<sup>4</sup>

The above references indicate that there is a Biblical basis for correlating the six days of work in Genesis 1 with the 6000 years of man's spiritual history from 4000 B. C. to about 2000 A. D., while the seventh day of rest corresponds to the promised millennium in which world order and peace is established for a time under Christ's reign. From Revelation 20 it would appear that the seventh millennium is to close with the final judgment. This sevenfold pattern of history is woven into other Bible passages as shown below.

In Genesis there is a peculiar association of the number seven with the name of Lamech. In chapter 4 verse 24 we read: "If Cain shall be avenged sevenfold, truly Lamech seventy and sevenfold." The Lamech of Genesis 4 is descended from Cain and is number seven in the genealogy beginning with Adam. In Genesis 5 the genealogy of the descendants of Adam through his son Seth lists a Lamech who lived 777 years. If there is a hidden meaning to this repetition of the number 7, perhaps it is to be found in the genealogy of the patriarchs.

When the ages of the patriarchs from Adam to Da-



vid are plotted on graph paper by succeeding generations, a definite continuity becomes evident as shown by Fig. 31 on page 241 of "Modern Science and Christian Faith".<sup>6</sup> The graph shows a rapid decline in ages after Noah and the flood. While a curve can be drawn showing a steady downward trend, the decline occurs in steps from an average of about 930 for the patriarchs from Adam to Noah (excluding Enoch and Lamech) to a level of about 450 from Arphaxed to Eber followed by a drop to an average of 236 from Peleg to Serug and then by a gradual decline from 205 to about 70 from Terah to David. Such a regular pattern seems to lend justification to the assumption that the early patriarchs from Adam to Noah actually lived about 900 years. Nevertheless, the longevity of the patriarchs remains something of a problem for modern science to explain.

It is peculiar that the average age of the patriarchs from Adam to Lamech at the time of the births of the sons listed in the King James Bible is about 100 years, the minimum age being 65 and the maximum 187. The Septuagint text gives a slightly different set of ages at birth of the sons, the average being about 180 years, the minimum 162 years, and the maximum 230 years. This suggests either a slower rate of physical maturing or else a shorter number of days in the so-called "year" at the time of the patriarchs. The longevity of the patriarchs and the unusually large number of years before the birth of the sons mentioned in the genealogy, presumably the first born in most cases except where death or other circumstances changed the line of descent, are therefore two problems which may have a common solution.

When we begin to look for some clue to the solution of these problems, the possibility that age was reckoned in terms of new moons rather than changes of season or years must be considered. There are about 30 days between new moons and approximately 12 new moons in one year. Therefore, we try dividing the ages of the patriarchs by 12 and discover that the greatest age would be 81 years and the smallest age 30 years. These life spans are well within the normal range of longevity of man as recorded in medical history. However, the figure of 30 for the total years of Enoch suggests another possible interpretation of the genealogy and ages in Genesis 5.

Enoch is the *seventh* man from Adam in this genealogy (cf. Jude 14) and receives special attention in Genesis 5:24 where we read "And Enoch walked with God; and he was not; for God took him". Enoch is translated while yet a young man relative to the life span of the other patriarchs. If we assume that Enoch represents a type of Christ (i. e., a prophetic symbol for Christ), then Enoch's translation at the age of 365 "years" corresponds to Christ's ascension into heaven at the age of about 33 years. If the total years of the

other patriarchs are multiplied by the ratio 33/365, the average age at death becomes 84 instead of 930 and is therefore closer to the average life span of men today in very healthy living conditions. This ratio also brings the ages at birth of the sons down to the range of 15 to 21 years according to the Septuagint text, which is a reasonable range considering that marriage probably occurred soon after puberty in early times. It will be noted that the minimum age of a patriarch at the birth of a son according to the King James (or Hebrew) text would be reduced to 6 years by applying this ratio (cf. Ramm,<sup>1</sup> p. 341). We are thus led to favor the Septuagint text in regard to the ages at the birth of the first son. The discrepancies in these ages between the Septuagint, the Samaritans and the Hebrew texts are in general such as might be accounted for by errors in copying. Since an error of omission is more likely than the error of addition of a digit in copying a number, the ages listed in the Septuagint text are presumably more accurate (see Table I).

**Table I. Comparison of Hebrew and Septuagint Texts**

Patriarchs	Hebrew Text		Septuagint Text	
	A	B	A	B
Adam	130	930	230	930
Seth	105	912	205	912
Enos	90	905	190	905
Cainan	70	910	170	910
Mahalaleel	65	895	165	895
Jared	162	962	162	962
Enoch	65	365	165	365
Methuselah	187	969	167	969
Lamech	182	777	188	753
Noah	500	950	500	950

A—Age at birth of first-born  
B—Total lifetime

Another patriarch who receives special attention is Enos, for after his birth "then began men to call upon the name of the Lord" (Gen. 4:26). The Lamech of Genesis 5 is also peculiar in that he lived only about 750 years (777 years in the King James text and 753 years in the Septuagint text) whereas all of the other patriarchs except Enoch lived about 900 years. This Lamech is number 7 from Enos and is the last of the patriarchs before Noah and the flood. Noah is number 10 from Adam in the genealogy of Genesis 5.

If in this genealogy we associate Enos with the first millennium of the spiritual history of mankind because "then men began to call upon the name of the Lord", we find that four millenniums pass before the appearance of Enoch, who typifies Christ, at the beginning of the fifth millennium. Enoch is translated while yet a young man, relative to the normal lifespan of the patriarchs, thus corresponding to Christ's ascension into heaven at slightly more than 30 years of age. There are then three millenniums from

Enoch to Lamech, the latter corresponding to the seventh or sabbatical millenium in which Christianity reigns.

Finally, from Revelation 20 we may conclude that the sabbatical millennium is followed by "a little season" in which Satan is loosed again, corresponding to the days of Noah when "the wickedness of man was great in the earth". Noah is the last of the patriarchs in the genealogy of Genesis 5 and is the tenth from Adam. While there is evidence that a great flood similar to that described in Genesis 7 and 8 occurred in the Mesopotamian valley during the early history of man,<sup>6</sup> it is possible that the account of Noah and the flood in Genesis may have additional significance as a representation of the end of the world and the final judgment (Matt. 24:37-39; Luke 17:26-30).

The whole of the above interpretation of Genesis 5 is outlined in Table II. The significance of the number 7 in this table is emphasized by boldface type. The number 365 is also considered to be significant not only as the number of days in a year but also as representing the age of Christ as explained above.

**Table II. Interpretation of Genesis 5**

Millen- num	Lineal Order	Name	Total Years	Interpretation
-	1	Adam	930	First human beings
-	2	Seth	912	The appointed seed
1	3	Enos	905	4000-3000 B.C. Man's spiritual history begins (Gen. 4:26). Beginning of civilized society (Toynbee)
2	4	Cainan	910	3000-2000 B.C. Semitic people settle Palestine and Sumeria
3	5	Mahaleleel	895	2000-1000 B.C. Abraham to David. Moses and the Law
4	6	Jared	962	Descent from David to Christ
5	<b>7</b>	Enoch	<b>365</b>	Millennium begins with Christ's coming. Growth of Christianity
6	8	Methuselah	969	Millennium ends in tribulation
<b>7</b>	9	Lamech	<b>777</b>	Sabbatical millennium
End	10	Noah	950	Final judgment. Eternal rest

The literal meaning of the word *Adam* is "human being". The word *Seth* signifies "the seed appointed" (Gen. 4:25), *Noah* means "rest", and the word *Jared* is from the Hebrew *yeredh* meaning "descent". These meanings of the names of the patriarchs have been incorporated in the interpretation of Table II. In addition, we note that *Enos* means "man", *Mahaleleel* means "praise of God", and *Enoch* means "dedicated".

In support of the above interpretation of Genesis 5 we shall show that a division of man's spiritual history into 7 epochs ending in the sabbatical millennium and the final judgment can be correlated with the opening of the *seven* seals in the "Apocalypse of John" in Revelation. It may also be noted that a rather similar division of history into 10 periods from Adam to the final judgment may be obtained by interpretation from the "Apocalypse of Ten Weeks" in the apocryphal book of Enoch.<sup>9</sup>

The interpretation of Revelation 6-22 is as follows:<sup>3,4</sup>

1. (4000-3000 B. C.) The event following the opening of the first seal is a vision of a conquering leader on a white horse, armed with a bow, and who is presented with a crown (Rev. 6). Perhaps this is symbolic of man the hunter who was given dominion over the animals of earth and told to subdue the earth (Gen. 1). White is the symbol of conquering leaders. This may also represent the scourge of tyrannical rulers.

2. (3000-2000 B. C.) Opening of the second seal is followed by the vision of a red horse (symbolic of war and bloodshed) with a rider who is given a great sword and the power to take peace from the world so that men should kill one another. This is symbolic of war and its power to destroy men. Wars between nations began in 3000-2000 B. C. with the Semites under Sargon conquering Sumeria in 2750-2550 B. C.

3. (2000-1000 B. C.) Opening of the third seal is followed by the vision of a black horse (signifying grief and mourning) with a rider who holds a pair of balances accompanied by a voice telling of high prices for wheat and barley (presumably resulting from crop failure). This is symbolic of starvation and the scourge of undernourishment in lands where the methods of producing food are inadequate. Starvation as the result of crop failure came to the Semitic peoples around 1600 B. C. at which time Joseph provided for his father and brothers from the storehouses in Egypt.

4. (1000 B. C. - 30 A. D.) Opening of the fourth seal is followed by the vision of a pale horse (symbolical of disease and death) on which sat a rider whose name was Death. This symbolizes the fourth great scourge of mankind, pestilence and disease. The Israelites escaped the plagues which afflicted Egypt just prior to the Exodus (c. 1200-1300 B. C.), and Aaron stayed the plague after the rebellion of Korah (Numbers 16) by burning incense, but the Israelites were heavily smitten by the Bubonic plague when the Philistines returned the ark of the covenant (c. 1050 B. C.).<sup>6</sup> Great plagues followed the gathering together of the Israelites for numbering in the time of David (c. 980 B. C.) (2 Samuel 24; I Chronicles 21). The pale horse and rider are followed by Hell, the symbol of captivity and punishment. It was during the period 800 B. C. to 500 B. C. that the people of Israel and Judah were punished by captivity and exile under the Assyrians and Babylonians.

It is significant that these four scourges are presented as visions at the invitation "Come (and see)" by each of the four beasts on the opening of each of the four first seals. In Revelation 6:8 it is stated that "power was given unto them over the fourth part of the earth, to kill with the sword (war), and with hun-

ger, and with death (disease), and with the beasts (some of them human) of the earth. These are the four scourges which are also mentioned in Ezekiel 14:21 as "the sword, and the famine, and the noisome beast, and the pestilence". These are among "the beginning of sorrows" mentioned by Jesus in Matthew 24:7-8. Thus the history of man (in particular of the Jews) is divided into four millenniums before Christ and three following, corresponding to the division in the opening of the seals into 4 and 3. In the oldest manuscripts of the Bible the words "and see" are omitted after the word "come" uttered by each of the four beasts, and the word "come" is not used after opening of the 5th, 6th and 7th seals.<sup>3</sup> Perhaps, therefore, we may interpret the word "come" as heralding the coming of Christ at the end of the fourth millennium.

5. (30-1000 A. D.) The opening of the fifth seal is followed by the vision of the martyrs slain for the Word of God. This presumably symbolizes the period of persecution and martyrdom of the early disciples in the years A. D. 30 to A. D. 311 as mentioned by Jesus in Matthew 24:9; Luke 21:12, 16. It is implied in Revelation 6:11 that there will be other martyrs in the centuries to follow.

6. (1000-2000 A. D.) The opening of the sixth seal is followed by the signs mentioned by Christ in Matthew 24 as attending and following the great tribulation. Thus we find parallel mention of earthquake, darkened sun and moon, falling stars, and fig tree. Mention is also made of worldly men seeking cover in caves and the rocks of the mountains, paralleling Isaiah's prophecy concerning the last days (Isaiah 2). In Revelation 7 the elect are sealed and gathered from the four quarters (winds) of the world as mentioned by Jesus in Matthew 24:31.

7. (2000-3000 A. D.) The opening of the *seventh* seal is followed by silence in heaven about the space of half an hour. This is presumably the time of peace and rest mentioned in Revelation 20. In Revelation 8, after the opening of the seventh seal, a recapitulation of the tribulation is given as the *seven* angels with the *seven* trumpets sound their trumpets one by one while the *seven* last judgments fall upon the earth. The infliction of four beginning tribulations is followed by three more woes of which the last or *seventh* judgment will mark the finish of the mystery of God. Only a third part of the world is destroyed on the sounding of the first six trumpets, corresponding to Jesus' promise that "for the elect's sake those days shall be shortened" that all flesh should not be destroyed (Matt. 24:22; Mark 13:20). *Seven* thunders, or prophecies, are uttered (Rev. 10) which are sealed until after the sounding of the sixth trumpet and revealed when the *seventh* angel sounds his trumpet (Rev. 10:7; 14). The *seven* last plagues are then poured

forth from the vials held by the *seven* angels, and the destruction of the world is completed as symbolized by the three sequences of *seven*, corresponding to the number 777, but not before the beast is revealed whose number is 666, the number of imperfection and of a world given over to judgment. The first heaven and the first earth pass away, but a new heaven and a new earth are given, and God's people dwell with Him throughout eternity (Rev. 21-22).

The above interpretation of the opening of the seven seals is presented mainly as an effort to justify the preceding interpretation of Genesis 5 and the 6 + 1 "days" of creation. Our purpose is to remove an apparent conflict between modern science and a literal interpretation of Genesis, not to add to the already voluminous literature on the Apocalypse of John.<sup>10,11</sup>

The sacred number 7 is also associated with Christ, the Messiah, in the following ways:

Daniel 9:24, 25. "*Seventy* weeks are determined upon thy people and upon thy holy city, to finish the transgression, and to make an end of sins, and to make reconciliation for iniquity, and to bring in everlasting righteousness, and to seal up the vision and prophecy, and to anoint the Most Holy. Know, therefore, and understand that from the going forth of the commandment to restore and to build Jerusalem, unto the Messiah the Prince, shall be *seven* weeks and three score and two weeks".

Luke 3. Jesus is 77 in the genealogy of Luke 3 which traces Jesus' ancestry through the priestly line back to God. Thus, God is number one, Adam is number two, Seth is number three, Cainan (not included in genealogies of Gen. 5-11 or I Chronicles 1-2) is fourteen, and Joseph (or Mary)<sup>12</sup> is seventy six.

Matt. 1. As stated in Matthew 1:17, the genealogy of Matthew 1 traces Jesus' ancestry through the royal line of David back to Abraham by three successions of the number 14.

The numbers 7 and 14 are frequently associated with the sacrifice of lambs. Thus, in Numbers 29:12-38 peculiar rules are given for the sacrificing of bullocks, rams, lambs, and a kid during the *seven* successive days of a feast which begins in the middle of the *seventh* month. The sum of the day of the feast and the number of bullocks offered on that day is 14 for the fifteenth through the twenty first day of the month. There are 7 feast days and on each of these days 14 lambs are offered. The ratio of lambs offered to rams offered is 7 for each day including the final day of assembly. The total number of bullocks offered on the feast days is *seventy*. The total number of kids offered in this time is *seven*. On the day of assembly exactly 7 lambs are offered.

The use of the number *seven* as a symbol for completeness is found in Matthew 18:21-22 where we read that Jesus admonished Peter to forgive a bro-

ther not just seven times, but until *seventy* times *seven*. Also, the sprinkling of blood upon the mercy seat and the altar was to be done seven times (Lev. 16:14, 19); Joshua marched the *seven* priests with the *seven* trumpets around Jericho *seven* times on the *seventh* day; the Israelites were commanded to keep the pass-over by eating unleavened bread for *seven* days and on the *seventh* day to hold a solemn assembly to the Lord and do no work (Ex. 13:6; Deut. 16:3, 4, 8).

The sabbatical day, the sabbatical year, and the year of jubilee indicate the significance of the number *seven* as a symbol for a complete cycle of time ending in a holy seventh period (Ex. 20:9-11; 31:15-17; 21:2; 23:10-11; Lev. 25).

While the above interpretation of Genesis 1-5 may remove an apparent conflict with modern science, it also brings us back to the Jewish tradition that there will be six millenary periods followed by a sabbatical millennium. The question arises whether these millennia are to be computed on the basis of prophetic years of 360 days<sup>12</sup> or of ordinary years according to the modern calendar. The difference by the year 2000 A. D. would amount to 29 years. Since Jesus began his public ministry in 29 A. D., then 2000 prophetic years beginning with this date will end in 2000

A. D.

There is reason to believe that the "abomination of desolation" mentioned in Daniel 12:11 and referred to by Jesus in Matthew 24:15 may be the Moslem mosque built by order of the caliph Omar on the site of the sacred stone in the temple area of Jerusalem and which in its present form is known as the Dome of the Rock.<sup>13</sup> Reckoning the 1335 years of the prophecy in Daniel 12:12 from the date of construction of Omar's mosque also brings one to about the year 2000 A. D.

We are thus led to regard the year 2000 A. D. with some interest.\* It is a striking fact that the world population appears to be increasing toward infinity by the year 2000 A. D. as shown by Fig. 1 in which the population curve approaches asymptotically the vertical line at 2000 A. D. As pointed out by Harrison Brown,<sup>14</sup> the world can probably not support more than 100 billion persons, and the actual population by the year 2000 A. D. would undoubtedly be much

\*It is not our purpose to call attention to a particular date. The end of the sixth millennium is uncertain by at least  $\pm 4$  years, and perhaps  $\pm 30$  years, because the beginning of the fifth millennium might be reckoned from Christ's birth in 4 B.C. or from the beginning or end of Christ's public ministry.

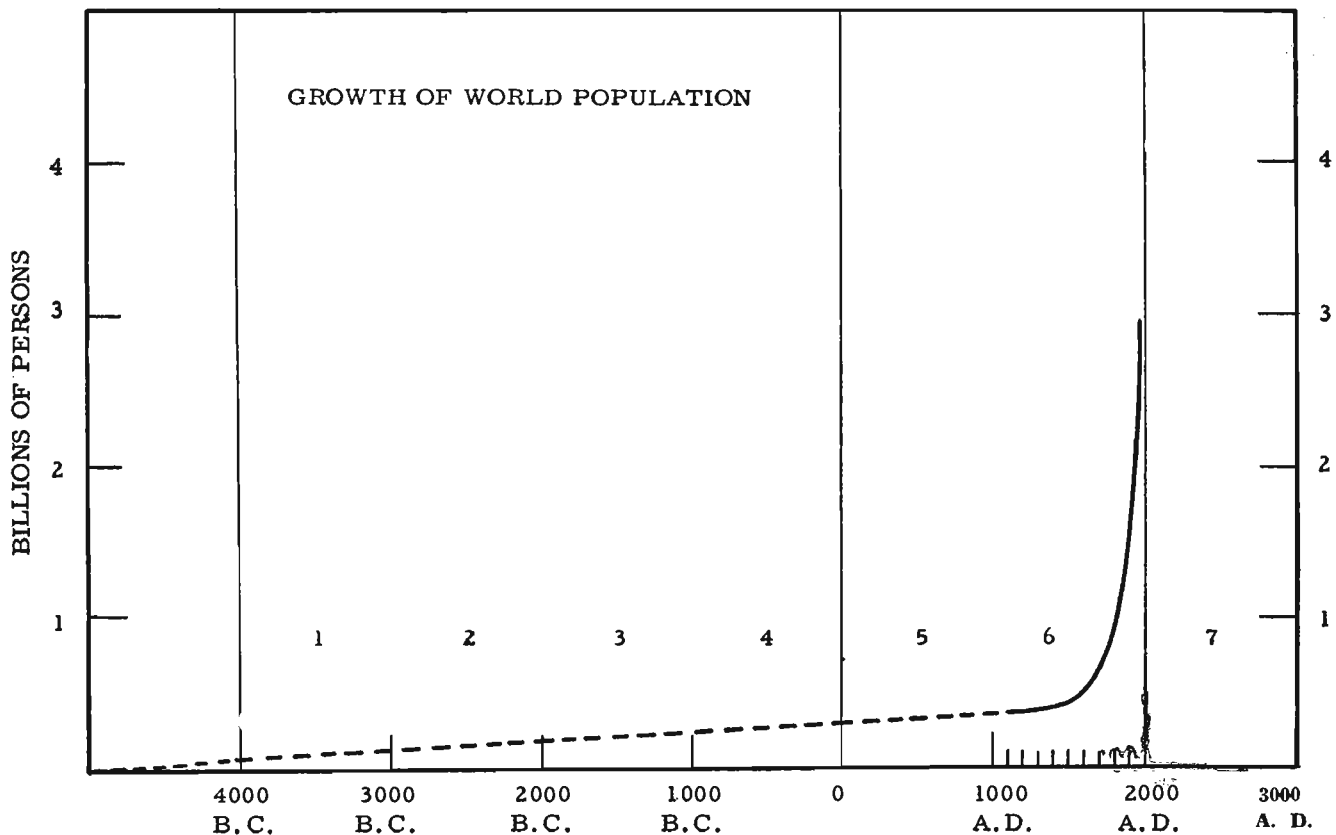


Fig. 1. Growth of world population in six millennia since 4000 B. C.

less than this. Since the Great Tribulation will presumably take place before the year 2000 A. D. according to the above interpretation, the world population may be drastically reduced before the beginning of the sabbatical millennium.

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# *The Nuclear Fallout Problem*<sup>\*</sup>

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## Introduction

The testing and use of nuclear bombs has introduced a new and entirely unique factor into the world which requires a most serious consideration of all of us. Nuclear explosions have disseminated radioactive debris throughout the entire globe. This debris is present on every square foot of soil on earth, it is transmitted into the food supply so that we consume some in every meal, it is present in measurable quantities within the bodies of every person living today. To be sure, the amounts at present are exceedingly small and the radiation which they give the human body is only a few per cent of that which is received from natural background radiation. Nevertheless many workers in the field feel that for at least some types of radiation injury (particularly genetic injury) the damage produced is strictly proportional to the quantity of radiation absorbed and that the relationship holds all the way down to zero radiation. This, of course, means that natural background radiation produces some deleterious effect. It also means that the increase due to bombs has increased this effect and thus bomb debris represents a distinct though very slight hazard to every individual.

## I. Physical Facts

Radioactive debris produced by bomb detonations may be divided into three categories, namely: 1) local, 2) tropospheric, and 3) stratospheric, with the fraction in each category depending upon the bomb size and the conditions of detonation. Local debris is that which quickly falls out near the test site and is of little consequence with regard to the world-wide picture. Tropospheric debris is disseminated into the lower atmosphere (below 40,000 feet) and is washed out by rain within a few months. It thus has time to distribute itself around the world longitudinally with the prevailing winds, but remains somewhat restricted in latitudinal distribution. Stratospheric debris goes into the upper atmosphere and comes down more slowly (mean residence time about 1-3 year.)

Fallout produced at bomb detonation consists of about 189 radio-isotopes representing 37 chemical elements. Fortunately more than two-thirds of these have physical half lives of less than one day. Various other factors reduce the principal hazard to two isotopes, namely strontium-90 and cesium-137. In addition, carbon-14 comes in for some consideration. Carbon-14 is not a fission product but is produced by the action of fission-produced neutrons on nitrogen. The present status of these isotopes in terms of their concentration in the human body is given in Table 1. Also included

in this table is the maximum permissible concentration (MPC) for each isotope as established by the International Committee on Radiation Protection for whole populations.

## II. Biological Danger to Man

The hazard from fallout may be divided into two categories: 1) somatic hazard, i. e., hazard to one's own body and 2) genetic hazard, i.e., that which does not affect one's own body but affects his progeny. Since strontium-90 is confined to the bones almost exclusively and since it emits only the less penetrating beta radiation, the isotope does not significantly increase the radiation to the gonads. Thus it is almost exclusively a somatic hazard. It is known to produce bone cancer and leukemia in high doses. Cesium-137 and carbon-14 on the other hand are distributed throughout the body and their principal hazard is presumed to be genetic. In establishing the hazard from present fallout, the assumption is made that radiation damage is a non-threshold phenomenon which means that there is no safe level below which no damage is done. This is thought to be more likely for genetic damage but is less generally accepted for somatic damage. It is impossible to demonstrate any damage from the low levels with which we are dealing in present fallout due to a) its very small magnitude, b) the many other variables involved and c) the statistical nature of the results. Therefore damage at high doses is evaluated and the results extrapolated to these low doses. On the basis of these calculations the present strontium-90 concentration in the skeleton would produce about 1000 leukemias and about 10,000 bone cancers in the entire world population in one generation. By the same sort of reasoning, it is estimated that genetic damage primarily from cesium-137 would result in 8,000 children being born with gross physical or mental defects in a subsequent generation and would also result in 20,000 stillbirths and childhood deaths plus 40,000 embryonic and neo-natal deaths in this generation. While these numbers are the result of considerable approximation, it nevertheless appears reasonably certain that people are living today with various ill effects in their bodies as a result of bomb fallout and that furthermore some lives have been shortened from this cause.

To put the problem in perspective, Table 2 summarizes various other radiation effects, including natural background radiation and variations thereof and radiation produced by medical X-rays and fluoroscopies. Although these data do not of course in any sense excuse the indiscriminate dispersion of fallout debris, it does show that other factors which we accept as a

<sup>\*</sup> From a paper presented at the 13th Annual Convention of the American Scientific Affiliation, Ames, Iowa, August, 1958.

part of our daily living are of much more consequence than the fallout. Crow, a geneticist of the University of Wisconsin, concludes that other effects in the non-radiation class such as food additives, smog, etc. are probably a greater hazard than radiation. A. M. Brues of Argonne makes a very interesting calculation in which he uses the same criteria for establishing MPC for cigarette smoking as is used for radiation. He concludes that the population MPC for cigarette smoking is 0.24 cigarettes per day or in other words, about one cigarette in four days.

Other hazards of our daily living could be cited, for example, the fact that approximately 40,000 people in the United States lose their lives each year from automotive accidents. Thus in terms of effects produced, automobile riding is much more hazardous than atomic radiation from the present fallout. Furthermore this hazard could be almost completely eliminated if a national speed limit of 25 miles per hour were put into effect with strict enforcement. We apparently feel however that this price of 40,000 deaths per year is a reasonable one to pay in the interest of convenient transportation. However, it is not valid to compare the automobile hazard as well as the other hazards we mentioned to the hazard of fallout since in the former case the individual has some choice in the matter whereas in the latter case, he has no choice. No one on earth can avoid fallout radiation. This brings us to our final point of discussion.

### III. The Moral Implications of Fallout

The general attitude of our government is that whereas fallout does produce a very small hazard, it is a reasonable price to pay in the interest of maintaining an adequate military defense. If we accept the fact that going to war is under proper circumstances justified, then this position of our government makes sense insofar as our own citizens are concerned, that is to say, that as citizens of the United States we should be willing to accept certain hazards in the interest of maintaining our government and our way of life. At the same time we should insist that our defense officials keep ever before them the philosophy expressed in this phrase from World War II, slightly reworded, "Is this bomb really necessary?" I personally am willing to take ten times the MPC of strontium-90 in my bones if it is necessary. On the other hand, I insist that even 1% of the MPC should not

be imposed upon me if it is unnecessary.

The more difficult problem comes however when we consider the effect on other people of the globe. While it is very proper for our government to say we shall demand that each of our citizens accept a small hazard to his life in the interests of our national defense, it is not so clear that our government has the right to this condition upon all people of the world. Is it proper that in the interest of our national defense we cause every child that is born on earth to be born with strontium-90 in his skeleton, which strontium-90 will in some cases (very few to be sure) result in bone cancer, leukemia, or other defects? This is the question which I leave for your consideration and for which I have no answer. However, two possible solutions might be suggested, 1) we might take the view that our government stands for the whole free world. We are seeking the best not only for our own citizens but for the entire world's population and therefore we are justified in having them assume this hazard with us. However, this then is without their choice. 2) We may take the view that after all fallout to date is insignificant and it is true that other hazards of life are much more important. It is also true that only a minute fraction of the world population is adversely affected. However it is difficult to class something as insignificant where in absolute terms it does result in the premature death of thousands of individuals.

	Microcuries in Body	Population MPC in Body	% MPC in Body
Sr <sup>90</sup>	10 <sup>-3</sup>	.7	3
Cs <sup>137</sup>	5 x 10 <sup>-3</sup>	9	0.06
C <sup>14</sup>	5 x 10 <sup>-3</sup>	25	0.02

Source	Radiation in mr per yr or per exposure
Cosmic rays—sea level	35
Cosmic rays—5000 feet	60
K <sup>40</sup>	19
Natural C <sup>14</sup>	1
People in crowd	2
Chest X-ray	~ 500
Fluoroscopy	~ 20,000
Present fallout	5

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# ARCHAEOLOGY

Allan A. MacRae, Ph.D.

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During the past two or three years excavation has been carried on intensively at various places in Palestine. Much of the work has been concerned with the period before 1,000 B. C. Since our Biblical material relating to Palestine is mainly from the period after 1,000 B. C. excavation from the earlier time is sometimes rather frustrating, as we have comparatively little written material to help in its elucidation.

One section of this earlier period in which there is considerable Biblical material is the period of the Israelite judges. Judges is a difficult book to interpret, since it tells about events in various parts of Palestine and does not always indicate how large a part of the country was involved in connection with the activities of each judge. The chronology of the period of the Judges is still largely unknown. If the dates contained in the book are simply added together it makes much too long a period and we know that many of these events must have taken place at the same time in various parts of the country.

Archaeology corroborates a number of particular elements or events mentioned in the book of Judges but has not yet given us sufficient evidence to show how to fit together the various parts of the book. No one of the excavations now going on has as yet made a significant contribution to this particular problem, but it is possible that comparison of the results of several of them may yet give us important clarification at vital points.

The excavations at Gibeon, Dothan, Shechem, and other sites are constantly increasing our knowledge of the practical background of life in early Palestine. Great numbers of small details are being added by each of these excavations. Little by little these will be pieced together by archaeologists. Excavations may thus sometimes yield significant results years after the actual work was done.

It is well to be prepared for discoveries which may at any time burst on the scientific world. Therefore, it would be good for readers of the *Journal of the American Scientific Affiliation* to have an idea of the background of some of the cities where excavations are being conducted.

Gibeon first comes to our attention in connection with the invasion of Joshua, when the men from Gibeon obtained a treaty with Joshua by false pretenses (Josh. 9). Since the Israelites had been ordered not to make any treaty with the inhabitants of the land, but to root them out entirely lest they be themselves corrupted by their wickedness, this was a serious error

and clear disobedience to God's commands. The Gibeonites had deceived Joshua by pretending to have come from a long distance. Joshua failed in his responsibility to carry out a full investigation, before making any actual decision.

All through subsequent history Israel suffered as a result of the mistake of Joshua in not looking before he leaped. God required that the rash promise be kept. Although the Gibeonites were reduced to servitude, their lives were carefully protected all through subsequent Israelite history, and those who broke this command and were severely punished (2 Sam. 21:1-9).

The preservation of the Gibeonites produced a foreign area which separated the large tribe of Judah in the south from the large tribe of Ephraim on the north, and, humanly speaking, had a great deal to do with the eventual breaking of Israel into two nations.

The *Saturday Evening Post* of February 8, 1958, carried an interesting popular account of the excavations at Gibeon, including pictures of a remarkable water works cut out of solid rock in the 8th century B. C. This provided a constant supply of water out of reach of enemies. The pictures of the massive works give one an idea of the importance of the city which he might never have realized from the Biblical account. Yet the Bible tells us that the city was so important that Solomon went there to make his great sacrifice after he became king. And it was there that Solomon had his famous dream (1 Kings 3).

Dothan is mentioned in the Bible in the earlier period. Joseph went there looking for his brothers (Gen. 37:17) and it was in that neighborhood that he was seized by them, put into a pit, and eventually sold to the Midianites. The city is little mentioned after that until we come to the later time of the Israelite kings, when we find that it occupies an important place in the life of Elisha.

Ever since 1953 Dr. Joseph Free of Wheaton College has been carrying on excavation at Dothan. There he has unearthed sections of the city that were actually in use at the time of Elisha. It makes the Biblical history seem much more real to see the type of houses lived in and the actual situation of the people among whom Elisha prophesied.

Shechem also was a city of great importance in early times. It was there that the sons of Jacob, through a trick, treacherously killed many inhabitants (Gen. 34). On account of this Jacob doomed the descendants of Simeon and Levi to be scattered abroad in Israel (Gen. 49). In the account of the judges Shechem plays an important role in the life of Abimelech, the son of Gideon. Shechem later became the first capital of Jeroboam, who led the secession of the northern tribes (1 Kings 12). For some reason he did not keep

his capital there long, but instead moved it to Tirzah (1 Kings 14:17; 15:33).

German excavators unearthed portions of Shechem early in the present century. Unfortunately, their material was never fully published. The more recent excavations naturally can use better methods and have considerably more funds available, but what was dug up by the Germans is of course not available for further excavation.

Every time a new place is excavated much is learned about the general life of antiquity and also about methods of successful excavation. At the same time much evidence is unavoidably destroyed. Large works of art and inscribed tablets are of tremendous importance, but sometime even more is learned from bits of pottery, from the type of houses and artifacts, and from the relations of different material objects to one another. Once they are dug up this relationship has been destroyed and all that remains is what has been observed by the excavators and photographed or written down. Thus archaeologists are anxious that excavation proceed as rapidly as possible, in order to increase their knowledge and improve their methodology, and yet they wish that all of the important sites could be left to be excavated after methods have reached their greatest improvement, in order that the utmost possible could be learned from them.

Hazor has been under excavation for a number of years by the Department of Antiquities of the State of Israel. The other three places we have named are all at present in Jordan, but Hazor is in Israel. Last year we noticed something of the excavation at Hazor. More has been learned since. Headlines in newspapers this spring declared the actual date of Joshua's conquest could be settled as a result of the Hazor excavation. Unfortunately, this particular statement must be put down to the desire of newspaper reporters for a sensation. One city alone will not determine the date of Joshua's conquest. Nor is it apt to be immediately determined by any newly-discovered material. Many details have to be worked over by many scholars before established and secure results on such difficult points as this can be attained.

Work on the Dead Sea Scrolls is proceeding, with many scholars studying the bits of manuscript that have been found. Sections of every book of the Old Testament, except one, have been found. Some of these sections contain only two or three words but in other cases a whole book or a substantial part of it is in hand.

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SEPTEMBER, 1959

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## PHILOSOPHY

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### The Resurrection of Theism

The philosophy of our time is largely distrustful of cognitive reason and sceptical as to the possibility of gaining absolute cognitive truth. For instance, Pragmatism sought a new concept of truth. Truth is not given statically for theoretical thought to apprehend; the truth of an hypothesis is its "cash value" in the solution of problems. Certain Existentialists have gone even farther. For Heidegger even the pragmatic viewpoint is the expression of the rational, technical attitude toward the world, a decadent attitude in which there is a forgetfulness of the truth of being. Being can appear to us only in a way that differs essentially from the conceptualizations of cognitive reason.

Give it enough time, however, and the worm will try to make his about-face. An evangelical writer, Stuart C. Hackett, has written a vigorous book, *The Resurrection of Theism* (Chicago: Moody Press, 1957), in which he strongly affirms the power of reason and the possibility of gaining absolute certainty.

Hackett's main purpose in this volume is to establish a philosophical foundation on which he can rehabilitate the rational proofs for the existence of God. The establishing of these proofs, in turn, is to form the basis for an entire system of apologetics, which is to appear in subsequent volumes.

The philosophical foundation on which Hackett wishes to build his philosophical edifice he calls *rational empiricism*. Following Kant he says that experience is possible only because the mind of man is outfitted with synthetic apriori categories, which are then filled with the material of sense experience. Before even the child can begin to count, for instance, its mind must have the (not necessarily conscious) idea of unity.

Having established rational empiricism to his satisfaction and having proved contradictory or meaningless its alternatives, Hackett proceeds to discuss the classical arguments for the existence of God. There is a traditional presentation of the cosmological and teleological arguments. In line with his rational empiricism, however, Hackett will not allow the validity of the completely apriori form of the ontological argument. As his basic approach Hackett accepts an ontological argument like that of James Orr in his *Christian View of God and the World*. In conclusion he enters into a more detailed criticism of objections to the theistic proofs.

Not only is Hackett's book vigorously reasoned, it is unreservedly rationalistic. Theism is brought again

and again to meet the test at the bar of neutral human reason. Its alternatives are formulated so they can be shown to be self-contradictory or meaningless. The triumphant march of reason is supposed to establish with apodictic certainty the existence of a most real being with intelligent purpose and government.

Apart from its merits or demerits, such an approach is refreshing. It would cut in one blow through the relativism, irrationalism, and even nihilism that has plagued our Western philosophy and brought it into crisis. Even a philosophical giant like Husserl sought in his rationalistic phenomenology to overcome the crisis of philosophy. Hackett is no phenomenologist, and he gives little indication of having written with the crisis of Western thought in mind; nevertheless, it is refreshing to see a bold attempt to give us again a hold on *the* truth. In discussing this attempt, we shall limit ourselves to a few observations.

One might agree with Hackett that there is a transcendental *apriori*; but the question still remains as to what kind it is. Like Kant Hackett derives the categories of thought from the forms of logical judgment. By way of contrast, Herman Dooyeweerd also says that there is a transcendental *apriori*; but it is not logical in character. Abstract-logical concepts like "unity" can have their meaning only on the basis of the various modal aspects of reality, only one of which is the logical. "Unity", for instance, has its original sense only in the mathematical aspect of reality. Otherwise it appears in an analogical sense, as "social unity", "aesthetic wholeness", etc. Dooyeweerd ranges the logical aspect beside the other aspects of reality, which are not logical in character and which resist inclusion in the logical concept. Continuing the comparison, Dooyeweerd therefore holds that ontology is basic to epistemology. In contrast, Hackett affirms that epistemology is basic to ontology. To my mind Hackett should not complete his system without having grappled with the problems raised by such a prominent evangelical thinker.

I would also bring up questions concerning Hackett's view of God as the *ens realissimum*, the most real being. Does not such a view imply that there is a graded hierarchy of reality, from the least real to the most real? Is not such a view meaningful only on what has been called "the great chain of being"? If so, does one not have to ask concerning the basis or criterion for this gradation? In Hackett's thought, for instance, God is the most simple, most unchanging, etc. Does not such a view do despite to the reality of God's creation, and also the sovereignty of God?

With reference to the last point we find that Hackett's rationalism lands him in a thoroughgoing univocism. The sythetic *apriori* with which the human mind is outfitted are the forms of rationality as such. As categories of rationality itself they are supposed by Hack-

ett to hold for the mind of God as well as of man (p. 55). Must we hold, then, that the sovereign God must think causally? Does this not make God subject to the law? By his language Hackett suggests this when he says that God is the complete rationalization of the absolute good (p. 233). Would it not be in the interests of preserving both the sovereignty of God and the reality of God's creation if we should accept Calvin's dictum, *Deus legibus solutus est*?

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Philadelphia 18, Pa.  
August 14, 1959.

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## SOCIOLOGY

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Probably the most practical, as well as profitable, step-child of sociology has been the field of market research. The man with the clipboard and interview schedules asking questions about one's preferences in TV, cereals, or soaps has become a common American fixture. Suffice it to say that all sociologists are not anxious to claim such heirs. Nevertheless, it has been mostly through basic research studies in mass communication media that techniques have been developed for the study of mass behavior in the market research field.

The application of such methods to a particular problem may provide results which are of theoretical, as well as immediately useful, significance. A trend seems to be developing in which as much attention is being given to the theoretical as to the applied emphases of research. For the religiously disinterested sociologist, studies into the religious behavior of people are merely another attempt at basic research. For the Christian, however, such data often become a practical sourcebook.

In an attempt to synthesize the available material on religious behavior, Argyle presents data on the Billy Graham Crusades held in England in 1954 and 1955\*. Using the variables of size of meeting, number of meetings, and leader at the meetings, some definite trends were indicated. The percentage of individuals making decisions was very significantly higher when the meetings were conducted by Graham himself. No doubt, the prestige of the leader is an important factor. Yet, the percentage was also considerably higher when the size of the meetings grew larger and there were fewer meetings. A more complete study would have to consider other possible variables in order to clarify the true effect of these factors.

Though Argyle suggests some social psychological

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mechanisms which would be working in these meetings, such as the effect of music, previous use of public relations and follow-up techniques, he does not dwell on the effect of the environment of the mass group. The lack of formal integration of such a group is often substituted for by an emotional contagion. The greater suggestibility of the individual in a mass situation will also contribute to the performance of action which is not customary. Advertising techniques rely on such phenomena as a means of selling products to individuals only peripherally interested or even with no need whatsoever. Undoubtedly, many who go forward at large evangelistic services are simply responding to the effects of mass suggestion. It could be seriously questioned whether they perceive any need or have been truly led of the Spirit. From the evidence, it would seem that the numbers of such individuals would increase with the size of the meetings.

By way of checking the hypothesis, a look might be taken at the permanence of conversions at the meetings. In one study after the Glasgow campaign, it was found that 54 per cent of new converts were still attending church a year after the campaign. Similar data

compiled at the end of the Harringay campaign provide similar results. This would indicate that only about half of the real converts are active a year later. It is conceivable that it was the original group of "peripheral converts" at the campaign which was lost. Although statements are made to the effect that "gradual converts" assume a more permanent church-going role, there is no specific data concerning these individuals.

The results of this basic form of research present several problems of application for the Christian sociologist. Should an attempt be made to transfer the "mass effect" of large evangelistic services to smaller ones, and if so, how might this be accomplished? Should an attempt be made to reduce the number of peripheral converts, and if so, what techniques should be employed? Is there some process of reinforcement which may be used to increase the "staying power" of converts? Sociology will begin to come of age when it uses its accumulated knowledge to approach such problems.

\*Argyle, Michael, *Religious Behavior*, The Free Press, Glencoe, Ill., 1959.