INVITED PAPER

EARTHS YOUNG MAGNETIC AGE CONFIRMED

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Abstract

The depletion of the earth's magnetic field is documented in scientific literature. This field shields the earth from some of the cosmic rays. The depletion of this shield has two side effects: 1) harmful biological effects, and 2) lowering of carbon-14 dates. The decay process is explained in terms of an equivalent circuit, providing simple solutions for the decay process. The theory and data are employed to set a limit on the age of the earth's magnet and, by inference, the age of the earth. Three independent checks provide confirmation of the theory.

Irreversible Worldwide Decay

There is some awareness now that our energy resources are being depleted and that conservation measures are needed. However, there are some natural energy-depleting processes that are beyond the scope of conservation measures. At least two of those processes are worldwide in scope: 1) The energy in the earth's rotation is being depleted, and 2) the energy in the earth's magnetic field is being depleted.

Each day there is some extremely small loss in the earth's rotational kinetic energy. The earth's rotational rate is decaying and the days are getting slightly longer. The standard unit of time, the second, is no longer based on the rate of rotation of the earth. It is based on an atomic vibrational frequency that does not decay. The instrument for measuring the standard second is the atomic clock.

The decay in the rotational rate of the earth is an inexorable process. There is no way to keep the earth's rotation from slowing down. There is neither a motor to keep the earth rotating, nor a suitable energy source to replace this continual loss of rotational energy.

Of more immediate importance, however, is the decay of the magnetic energy and its associated magnetic field. This is a much more rapid decay and there are unwanted environmental consequences. Harmful cosmic rays are coming in from all directions, headed toward the earth. Cosmic rays are extremely energetic charged particles. When they strike the atmosphere, they set up showers of secondary cosmic rays. Cosmic rays are very penetrative and have been detected at the bottom of deep lakes. The most desirable protection from cosmic rays is to have them deflected away from the earth before they reach our atmosphere.

The earth's magnetic field extends into space beyond the earth's atmosphere. A magnetic field will deflect the path of charged particles moving across the magnetic field. So the earth's magnetic field deflects cosmic rays, causing many of them to miss the earth's atmosphere. This magnetic shield is a great blessing, but time is running out for this magnetic shield.

The depletion of the earth's magnetic field is an inexorable process. There is no way to keep the earth's magnetic field from decaying. There is no power plant in the earth to sustain the earth's magnet or to regenerate it after it is gone. Nor is there any suitable energy source there to run the power plant if there were one.

Documentation of the Magnetic Decay

In his 1951 book, *The Earths Magnetism,* the famous geophysicist Sidney Chapman declared that the great scale of the decay of the earth's magnetic field is: "not paralleled for any other worldwide geophysical phenomenon."[1] In the 1965 ESSA Technical Report, *An Analysis of the Earth's Magnetic Field from 1835 to 1965,* it stated that: "if this decay rate persists, the earth's dipole magnet will vanish in A.D. 3991."[2]

In the August 1976 issue of *Industrial Research and Development,* Frederick Jueneman's article, "Magnetic Depletion," states:

> All the recent commotion about the exponential depletion of our natural resources has singularly failed to mention that we are also running out of a rather vital, apparently nonrenewable resource, the Earth's magnetic field, quite rapidly.[3]

These conclusions are based on the evaluations of the earth's magnetic moment, the one quantity that specifies the state of the earth's magnet, its strength and direction. These are the only meaningful evaluations of the state of the earth's magnet.

Each evaluation was based on a huge number of measurements from an extensive portion of the globe. Each real-time measurement contained not just the "signal" desired but magnetic "noise." It was a monumental task to reduce these data to obtain the magnetic moment.

Description of the Earth's Magnet

The earth's magnet is vastly larger and stronger than any man-made magnet. It is located in the core of the earth. Its diameter is about seven million meters. The material in this magnet is some molten metal, perhaps it is predominantly iron and is a much better conductor than the rest of the earth, outside the core.

The material is too hot for it to be a permanent magnet. This magnet depends upon the flow of electric current. Any time an electric current flows there is a magnetic field associated with it. An electric current can produce a magnet no matter how high the temperature is.

The electric current flows in a circular path around the axis of the magnet. The magnetic axis is tilted 11.5 degrees away from the earth's spin axis. That is one reason why it is known that the earth's spin does not generate this magnet. The earth's spin energy and its magnetic energy are both decaying, but from different causes.

The present value of the electric current in the earth's magnet is six billion amperes. That is a huge current. The average total current in a home is, perhaps, not more than 30 amps. If that be correct, the electric current flowing in the earth's magnet is equivalent to the electric current flowing in 200,000,000 homes.

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The Decay Process

The equation for a natural decay in physics is well known. However, it is worthwhile to consider the physical processes involved. The earth's magnet had an initial amount of energy (the energy in its original magnetic field). It has been continually losing this energy ever since.

The lost magnetic energy has gone into heat energy, as might be expected from the second law of thermodynamics. As illustrated in Figure 1, the transition from magnetic energy to heat energy takes place in two stages. The magnetic energy is transformed into electric energy. Then the electric energy is transformed into heat energy.

Since there is no power plant to generate the electric current, the current attempts to dissipate immediately. The self inductance of the core of the magnet prevents that from happening. As the magnetic field tends to collapse, that very action induces a current in the core which tends to sustain the electric current. It is a delaying action on the decay process.

That induction process can be expressed as Lenz's law. Any time there is a rate of change of the magnetic field, in this case a diminishing of the magnetic field, it induces a "back" electromotive force that tends to oppose the process. This electromotive force causes a forward current to flow in the metal core. That induced current replenishes the current, keeping it from dying out rapidly.

The self inductance is a function of the dimensions of the core. The larger the core of the magnet and smaller the resistance of the core, the longer it takes for the magnet to decay. The reason the earth's magnetic field takes a few thousand years to decay is that the core is very large and its electrical resistance is quite small.

The diameter of this magnet is approximately half the diameter of the earth. So its decay time is vastly longer than the decay time of a laboratory electromagnet. However, laboratory magnets obey the same laws of physics and their decay times are computed from the same fundamental electromagnetic equations.

Hence the decay process in the earth's magnet has been analyzed by the same type of reliable equations as those employed in applied physics and electrical engineering. The depletion in the magnetic field of the earth is predictable and it has been confirmed by the historical evaluations of the state of the earth's magnet.

The Half-Life of the Earth's Magnet

The equation for natural decay processes is an exponential equation. A simple way to describe the decay is in terms of the half-life. A half-life is the time it takes to decay to half of the value it was in the beginning.

The half-life of the earth's magnetic energy is 700 years. The magnetic energy is reduced by a factor of two every 700 years. Today there is only half as much energy in the earth's magnet as there was 700 years ago. There is only one-fourth as much as there was 1400 years ago, and only one-eighth as much as there was 2100 years ago. The half-life of carbon-14 is approximately 5,700 years. The earth's magnetic energy is decaying about eight times as fast as the rate of decay of carbon-14.

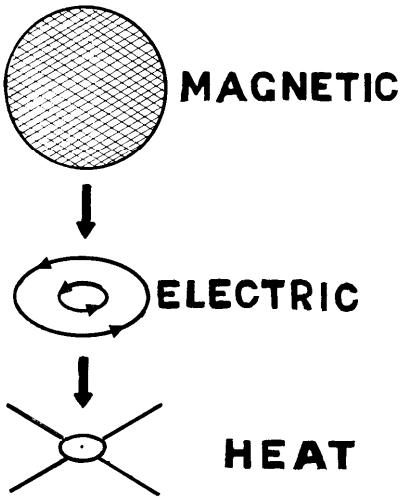

Figure 1. Schematic Energy Flow in Earth's Magnetic Field.

The magnetic field acts as a magnetic shield. The variation in the strength of this shield can alter the radiocarbon dates. A weaker shield lets in a greater number of cosmic rays. That increases the rate of production of carbon-14 in the atmosphere. This factor tends to yield a younger carbon-14 date, particularly on the older dates. However, this is such a complex problem that this information has not been employed to yield accurate corrections.

Age Limit on the Earth's Magnetic Field

When comparing half-lives of the earth's magnet with the half-life of radioactive decay one should employ the half-life of the energy in the earth's magnet. In radioactive decay, the loss is in mass and that is equated to energy.

If one is concerned with the field strength, or with magnetic shielding, a half-life of 1400 years should be employed. The factor of two between the half-life of the magnetic field and the magnetic energy is due to the fact that the energy is proportional to the square of the field strength. Going backward in time the magnetic field strength was twice as strong 1400 years ago, four times as strong 2800 years ago, eight times as strong 4200 years ago, etc.

These stronger magnetic fields in the past can be employed to set a limit on the age of the earth's magnetic field. Ten thousand years ago the earth's magnetic field would have been 141 times as strong as it is today. That value is about as strong as the magnetic field of some the magnetic stars.[4]

If one makes the reasonable postulate that the earth's magnetic field was never as great as that of a magnetic star, this puts a limit on the age of the earth's magnet of less than 10,000 years. That seems to be a reasonable postulate because the star is said to have a nuclear source of energy and there is no reason to think that the earth has ever been a star.

Circuit Theory Solution

There are two basic methods of solving problems in electricity and magnetism: 1) circuit theory and 2) field theory. The simplest of these is circuit theory.

When the electric current is confined to a wire, one may use circuit theory. When the current is spread out

over a broad expanse of conductive material, as it is in the earth's core, field theory is required in most cases. Field theory has been employed in all of the solutions referred to thus far. However, it may be helpful to those who know circuit theory and are not familiar with field theory, to use circuit theory solutions to this decay phenomenon. One may employ an "equivalent circuit" to solve for some of the overall effects.

In this simplified approach to the decay problem, the earth's spherical core model is replaced by a circular loop of wire model. The loop has a diameter almost as large as the diameter of the earth's core. It has the same current and power dissipation as the earth's core. It is, for the limited conditions under which it is employed here, an equivalent electromagnet. There is no generator in this circuit. The electric current is decaying, in accordance with the real-time measurements of the earth's magnetic moment. The electric current it has now is what is left of the original current (the current it had when the magnet was created).

The well known solutions for the decay of the current in this type of circuit can now be employed to evaluate the resistance and inductance of the earth's core. To begin with one can use the following values that have been obtained from evaluations of the earth's magnetic moment and from the solutions in the author's original paper:[5]

Time constant	$T = 6.2 \times 10^{10}$ seconds
Magnetic moment	$M = 8 \times 10^{22}$ amp meter^2
Current	$I = 6 \times 10^{9}$ amp
Power	$P = 8 \times 10^{8}$ watt

One may use the following circuit theory equations to solve for the resistance (R), the self inductance (L), and the radius (r) of the wire loop:

$$P = I^2R \quad (1)$$

$$T = L/R \quad (2)$$

$$M = \pi r^2 I \quad (3)$$

The answers are:

Resistance	$R = 2.2 \times 10^{-11}$ ohm
Inductance	$L = 1.4$ henry
Loop radius	$r = 2.1 \times 10^{6}$ meter

Circuit theory tells one that if a current were induced in that wire loop, the current would continue to flow, without a battery or generator, for a few thousand years. Its half-life would be 1,400 years.

Reasonableness of the Solutions

The reasonableness of these solutions, which depend upon the decay of the earth's electromagnet, can be seen by noting how well they check with independent solutions that do not depend upon any decay. Three examples will be given:

1) The value of the self inductance (L) of the earth's core does not depend on the current, or on the decay. The self inductance was evaluated in the preceding section by the use of circuit theory and the time constant of decay. The answer for that solution is L = 1.4 henry. The original definition of the unit of inductance, the henry, can be used to give an independent evaluation on the inductance of the core of the earth. In the original definition the henry is the inductance of a wire of length 10^7 meters. (The length of a quadrant of the earth.) In the equivalent circuit the length of the wire is the circumference of the loop. In view of the known radius, the circumference of the loop is 1.32×10^7 meters. Applying the definition of the henry, the inductance L = 1.32 henry for the loop and hence for the earth's core. That is confirmation of the exponential decay theory which was used to evaluate the core's inductance.

2) Employing the field theory solution to the exponential decay of the earth's electromagnet, the author obtained this equation for the decay time constant (T):

$$T = \sigma\mu r^2/\pi^2 \quad (4)$$

where σ and μ are, respectively, the conductivity and permeability of the core. The time constant was computed from the magnetic moment data. The radius of the core is known. Using those values in this equation yields the value of conductivity of the earth's core of 4×10^4 mho/meter.[6] The value of 3×10^4 mho/meter is the value of the conductivity of the core of the earth obtained by F. D. Stacey from metallurgical considerations.[7]

3) The conservation of energy principle illustrated in Figure 1 has been used to evaluate the magnetic energy in the earth's magnetic field. If the decay theory is correct, that field energy is the only energy source this magnet has. It follows that the magnetic field energy equals the energy that will be lost in heat. That heat energy was computed by integrating the exponential power equation from time zero to infinity. The calculation yields the heat energy and it is equal to the present magnetic field energy.

The answer is:

Earth's magnetic energy = 2.5×10^{19} joule.[8]

This value of the magnetic energy in the earth's dipole magnet is very important. If it is the correct value, it confirms the exponential decay theory of the earth's magnet. That value of the earth's magnetic energy has been verified by another evaluation of the earth's magnetic energy that is unrelated to the decay. The author has computed the magnetic energy in a uniformly magnetized sphere of the same dimensions as the earth's core and having the same value of magnetic moment as the earth's magnet. Its magnetic energy is 1.5×10^{19} joule. This is a fairly good check, even without the needed correction for the different current distributions in the two different types of magnets.

The earth's magnet has its real current distributed through all of the core. That was evaluated in the author's field theory solution. The permanent magnet has a known amperian current that is all located at the surface of the magnet. When the correction for this difference in the two magnets was made, there was a perfect check.[9] This confirms not only the present value of energy in the earth's magnet, but also the exponential decay theory upon which that evaluation was based.

Summary

The irreversible worldwide decay of the earth's magnetic field is documented by the only kind of data from which one can evaluate the state of the earth's magnet, its magnetic moment. The depletion of the magnetic field is a relatively rapid phenomenon, not paralleled by any other worldwide geophysical phenomenon. The diminishing magnetic field strength allows more cosmic rays to impinge on the earth. This

has detrimental biological effects. It also alters the carbon-14 dating, tending to reduce those age dates.

The earth's magnet is an electromagnet that has a current of six billion amperes now. There is no power generating plant down in the earth to maintain that current. This magnet is consuming energy and there is no source of energy to sustain it other than the magnetic energy that is presently in its field. In accordance with the law of conservation of energy, the magnetic energy decays into heat energy. This energy transfer takes place in two stages. The magnetic energy goes into electric energy through the process of electromagnetic induction as it tends to die out. This induced electric energy goes into heat energy in the core.

This induction process of generating a forward current as the magnetic field decays, replenishes to some extent the current that is dying. This process prevents the magnet from dying immediately. That is why it requires a few thousand years for the earth's magnet to be depleted. The larger the core of the magnet and the lower its resistance, the longer it takes to decay. The evaluations of the earth's magnetic moment show that the half-life of the magnetic field is 1400 years.

If one computes the magnetic field strength back in time 10 thousand years, the earth's magnetic field would have been as strong as that of some magnetic stars. The reasonable assumption has been made that the earth never had a magnetic field as strong as a star's magnetic field. On the basis of an original magnetic field strength of the earth that is less than that of a magnetic star, the origin of the earth's magnet is less than 10 thousand years ago.

Since there is no power generating plant in the earth its origin must have been at the time of creation. This means that the young magnetic age of the earth's magnet also means a young age for the earth itself. These conclusions are based upon the decay theory of the earth's magnet. That is supported by:

1) The real-time evaluations of the earth's magnetic moment.

2) The only rigorous theoretical explanation of the present processes in this electromagnet.

3) Three types of independent confirmational checks on that theory.

References

1. Chapman, Sidney. 1951. The earth's magnetism, Methuen and Co., Ltd. London: John Wiley and Sons, Inc., New York, p. 23.
2. McDonald, Keith L. and Robert H. Gunst. 1967. An analysis of the earth's magnetic field from 1835 to 1965, ESSA Technical Report, IER 46-IES 1. U.S. Government Printing Office, Washington, D.C., p. 1.
3. Jueneman, Fredrick B. 1978. Magnetic depletion, *Industrial Research and Development*, 20(8):13.
4. Barnes, Thomas G. 1983. Origin and destiny of the earth's magnetic field, second edition. Institute for Creation Research, El Cajon, CA., p. 36.
5. Barnes, Thomas G. 1973. Electromagnetics of earth's field and evaluation of electric conductivity, current, and joule heating in the earth's core, *Creation Research Society Quarterly*, 10:222-30.
6. Barnes. 1973. *Op. cit.*, p. 228.
7. Stacey, F. D. 1967. Electrical resistivity of the earth's core, Earth and Planetary Science Letters, North Holland Pub. Co., Amsterdam, pp. 204-06.
8. Barnes. 1983. *Op. cit.*, p. 108.
9. *Ibid.*, pp. 104-12.

BOOK REVIEWS

Ancient Diamond Time Capsules, Secrets of Life and the World by Charles E. Melton. 1985. Melton-Giardini Book Company, Route 2 Box 18, Hull, Georgia 30646. 166 pages. $5.95 pb. $9.95 hb.

Reviewed by Eugene F. Chaffin*

Most of the "big picture" encountered in this book developed by starting with experimental studies of the fluid inclusions found in diamonds collected from all parts of the globe. The author is a well qualified physical chemist at the University of Georgia, and most of the work reported was performed with A. A. Giardini, a professor of geology, also eminently qualified in the fields of crystallography, mineralogy, and related areas. While Drs. Melton and Giardini do not espouse true creationist views, they have nevertheless presented some views of petroleum origins, chemical evolution, and the thermal history of the earth which are sometimes at variance with the views of conventional evolutionary dogma.

The basis for the views presented seems to be a 6.3 carat diamond from near Murfreesboro, Arkansas. This particular diamond was free from biotite and other potassium bearing minerals. It was crushed in an especially constructed diamond crusher (with elements constructed from tungsten carbide), and the fluid inclusions released were analyzed in a high sensitivity mass spectrometer.[1,2] The ratio Argon-40 to Argon-36 was found to be 189. By assuming that the earth's mantle contained negligible Ar-40 when it formed, it was deduced that the diamond was 3.1 billion years old. In a separate work it was deduced that the Arkansas diatreme where the diamond was erupted should be dated at 100 million years before the present.[3] This particular diamond contained no potassium, hence the figure of 189 for the Ar-40/Ar-36 is assumed to be representative of the earth's mantle at the time the diamond was formed. This information and other information about the fluid inclusions in this diamond is the scientific data used to build the views of petroleum formation and chemical evolution presented in the remainder of the book.

Creationists have previously criticized the assumptions made by evolutionists regarding initial Ar-40 content in rocks. See for example Whitelaw[4,5] and Clementson.[6] Also, published studies of Ar-40/Ar-36 ratios have shown them to vary from values above 16,000 to very small values.[7-9] Hence we are justified in stating that the 189 ratio of Ar-40/Ar-36 in the diamond inclusions does not indicate the "age" of the diamond or of the earth for that matter. Other items in lists of possible "flaws" in radioactive dating methods would also be relevant. Hence, there is no real basis for the main thrust of the remainder of the book.

Dr. Melton starts from the diamond's supposed age and data on the chemical composition of its fluid inclusions to try to build a theory of the evolution of the atmosphere. In this case, and in some other important discussions in the book he follows the debating tactic of oversimplifying the opponents' posi-

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tion, removing supporting details, and then presenting his own position complete with all its detail. In this discussion of atmospheric evolution he follows Don Quixote's practice in dreaming up an opposing "dragon." The dragon for this episode is the sudden catastrophic degassing theory of evolutionists. The "theory" is not really a theory since it postulates a sudden release of the earth's atmosphere from the interior, soon after the earth's formation, an event which like all models of origins cannot be duplicated in the laboratory due to its supposed occurrence at a singular past moment in time. Dr. Melton then claims to have constructed a more "scientifically" sound theory of continuous atmospheric degassing based on his data on fluid inclusions in diamonds. While the inclusion of the diamond data would seem to make the discussion "scientific," closer inspection reveals unsound speculation, since assumptions are made to derive an age for the diamond, the diamond inclusions are assumed to be representative of the earth's mantle as a whole, etc. On page 44 of the book mention is made of Dr. Henry Morris and the Creation Research Institute. Creationists such as Dr. Morris are dismissed as being "unscientific" since they assume things about the earth's origins which are not subject to testing in scientific laboratories. In so dismissing creationism, the non-testable nature of any model of origins is passed over, ignored, or unfortunately not recognized. In particular, the book's presentation of a continuous degassing model is subject to the same criticism since it is not the slightest bit more "scientific" than the others.

In the concluding chapters of the book, a curious speculation on the chemical evolution of life is presented, only a slight modification of speculations of D. E. Tyler.[10] Instead of the production of amino acids by lightning in an atmosphere of hydrogen, methane, ammonia, carbon dioxide, and water vapor, and subsequent formation of life, Dr. Melton takes the unorthodox viewpoint that life originated in petroleum. This is supported in Chapter 5 by a model for the non-biogenic origin of petroleum. However, Dr. Melton believes that mere formation of the chemical constituents of life is not enough, but some type of "force of creation" is needed to form a living entity. Overlooked are the extreme improbabilities of the formation of DNA or RNA from constituent molecular parts, the simultaneous formation and location of enzyme proteins, and the formation of protective coatings to make these primitive life forms. However, the fact that life is more than just its constituent chemical parts is considered. Thus the book is basically uniformitarian in its beliefs pertaining to origins, but it does present a "force of creation." The book mentions Christ on page 99, where it refers to the "reported resurrection" of Christ, as if the issue of His bodily resurrection were in doubt. Thus, it would seem that this book is to creationism as the cults are to true Christianity.

There are some minor errors in the printing of the book. On pages 54-55 reference is made to equation 3-6, but there is no equation 3-6. Equations 2-4 and 3-3 should be the same but they are not. On the whole the book may be of use to those interested in serious research on the subject of origins, and certainly to those who would like to keep up with the current trends in scientific thought.

References

1. Melton, C. E. and A. A. Giardini. 1986. The isotopic composition of argon included in an Arkansas diamond and its significance. *Geophysical Research Letters* 7:461-64.
2. Melton, C. E. and A. A. Giardini. 1982. The evolution of the earth's atmosphere and oceans. *Geophysical Research Letters* 9:579-82.
3. Gogineni, S. V., C. E. Melton and A. A. Giardini. 1978. Some petrological aspects of the prairie creek diamond-bearing kimberlite diatreme, Arkansas. *Contributions to Mineralogy and Petrology* 66:251-61.
4. Whitelaw, R. L. 1968. Radiocarbon confirms Biblical Creation (and so does potassium-argon). *Creation Research Society Quarterly* 5:78.
5. Whitelaw, R. L. 1969. Radiocarbon and potassium-argon dating in the light of new discoveries in cosmic rays. *Creation Research Society Quarterly* 6:71.
6. Clementson, Sidney P. 1970. A critical examination of radioactive dating of rocks. *Creation Research Society Quarterly* 7:137-41.
7. Brown, J. F., C. T. Harper, and A. L. Odom. 1974. Petrogenic implications of argon isotopic evolution in the upper mantle. *Nature* 250:130-33.
8. Ozima, M. 1975. Ar isotopes and earth-atmosphere evolution models. *Geochimica et Cosmochimica Acta* 39:1127-34.
9. Dymond, J. and L. Hogan. 1978. Factors controlling the noble gas abundance patterns of deep sea basalts. *Earth and Planetary Science Letters* 38:117-28
10. Tyler, D. E. 1983. Originations of life from volcanoes and petroleum. Ryan Gwinnes Press, Portland.

The New Evolutionary Timetable, by Steven M. Stanley, 1981. Basic Books, Inc., New York. 222 pages. $17.50.

Reviewed by Clifford Lillo*

That evolutionists are divided in their interpretations of science, the fossil record, and Darwinism should come as no surprise to anyone. This book illustrates the magnitude of that division while the author emphasizes repeatedly that he and all true scientists believe in Darwinism, seemingly regardless of where that faith leads.

Dr. Stanley is a firm believer in punctuational evolution, thereby aligning himself with Otto Schindewolf, Ernst Mayr, Niles Eldredge, Stephen Jay Gould, and George Gaylord Simpson. He says:

> This book is not designed to build a rigorous case for the punctuational model of evolution— the goal of my more technical volume, *Macroevolution: Pattern and Process*, published in 1979. Rather, in the present book I attempt to give the interested non-specialist access to the punctuational view and its implications— implications that are by no means trivial. (p. xv)

In the ten chapters of the book he introduces the "non-specialist" to Darwinism and shows how Darwin's gradualistic evolutionary views-although rejected at first by most scientists— became accepted but are now giving way to the concept of punctuationalism. In describing the swing away from Darwin's gradualism views, the author says:

> Throughout the 1940's . . . the geneticist Richard Goldschmidt argued for the sudden appearance of species by macromutation. Because of his prominence as an experimentalist, Goldschmidt was too conspicuous to be ignored and he . . . was ostracized by the evolutionary community. (p. 71)

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Later in the book the author adds, "Goldschmidt's most controversial construct was the hopeful monster,' the single animal supposed to constitute a new genus or family at birth." (p. 135)

In 1950, Schindewolf, a prominent German paleontologist, was widely derided in English-speaking countries because he "published two books that were shockingly anti-Darwinian." (p. 108) Schindewolf was attempting to reconcile the facts of paleontology with the theory of evolution and "he adopted the old idea of macromutation, envisioning such things as the first bird hatching, fully formed, from a reptile egg." (p. 108) Continuing his history, the author says, ". . . in 1954 Ernst Mayr published his paper suggesting that 'evolutionary novelties' often evolve rapidly in localized speciation events . . ." (p. 108). After the early 1950's:

> Punctuationalism went underground for nearly two decades. It was not until 1971 and 1972, when Niles Eldredge and Stephen Jay Gould reiterated Mayr's arguments on speciation, that biologists finally began to take notice . . . The time was ripe for change. (p. 108)

What does Stanley himself believe? He says: "In retrospect, it seems to me that Goldschmidt deserves posthumous accolades for his steps in the right direction, though they may have been steps too far." (p. 135). On another page he adds, "It is virtually inconceivable that the first bird emerged full blown, from a dinosaur egg . . ." (p. 166) With his qualifying words "may have been" and "virtually," Stanley apparently is not rejecting the "hopeful monster" theory outright but is leaving the door open just in case later developments prove the Schindewolf / Gould / Simpson "monster" view to be the "correct" one.

Just what is the punctuationalism view that Stanley is espousing? The author says:

> . . . I have suggested that we erect unambiguous and nonextreme models: the *gradualistic model*, representing the traditional view, holds that most evolutionary change in the history of life has taken place within fully established species, while the *punctuational model* asserts that most change is associated with speciation that involves small populations . . . I will attempt to show how most genera, families, and still larger branches of the tree of life have developed mainly by way of one or more steps of rapid evolution associated with branching (speciation). (p. 78)

The technique the author has used is well known to creationists who advocate two models of origins: the creation model and the evolutionary model. As Henry Morris has stated:

> There are only these two possibilities. There may be evolutionary submodels (e.g., different evolutionary mechanisms or sequences) and various creationist sub-models (e.g., different dates of creation or events of creation), but there can be only two basic models-evolution or creation.[1]

Dr. Stanley does have a few words about creationists:

> There is no doubt that the new punctuational movement will bring joy to the hearts of creationists— those who claim species to be discrete entities that a divine being brought separately to life and placed upon the earth."

His definition of creationists, although close, does not coincide with definitions usually given by creationists themselves: A creationist is one who believes that "major categories of nature were formed by special creative and cataclysmic, purposive processes in the past which are no longer in operation today . . ."[2] The difference in the two definitions is quite significant. Creationists believe major categories were created and that from those major categories, or "kinds," many species have developed. Creationists believe that God created birds and that birds beget birds and no one has ever provided proof that it did not happen. Birds can change within the limits of their gene pool, but birds are always birds. Stanley continues:

> . . . if creationism had to rise again, it is well that we have punctuationalism to counter some of its arguments. Many of the complaints that creationists have leveled at gradualistic evolution (complaints that this model of change does not square with the facts of the fossil record) now appear baseless. With the acceptance of the punctuational scheme, the sudden appearance in the fossil record of many distinctive groups of animals and plants need trouble evolutionists no longer. (p. 165)

Dr. Stanley is right in one respect: the evolutionary model does not square with the facts in the fossil record. With the creation model, a book that has been in existence for well over two thousand years was seen by scientists to fit the facts of the fossil record with amazing accuracy. By contrast, with the evolutionary model, a book written in 1859, with no evidence to support its allegations, nevertheless has been accepted by some scientists in the hope that future generations would find it to conform to the fossil record, but it has failed dismally. The fossil record shows all types of animals and plants first appearing as fully formed, without a long evolutionary development. Stanley's technique is to accept the evidence and his "punctuational model" fits the fossil record. But, does that render invalid the creationist viewpoint? He believes it does, but the arguments he presents in his book fail to convince the reader.

How does the punctuational view account for the existence of life on earth? It falls back on the old evolutionary claim that life formed from non-life and then the first living creatures multiplied. "It can now be shown that trace fossils make their first appearance in the record as simple tubelike structures of very late Precambrian Age . . ." (p. 87). What Stanley does not mention is that these "simple tubelike structures" represent highly complex life forms. As Parker has said:

> Actually, very few Precambrian fossils have been found, but those that have strongly support the creation concept. Soft-bodied jellyfish and members of the earthworm group (annelids) have been found, for example— separate and complex types like those living today.[3]

In what way does Stanley provide proof for the punctuational method using the fossil record? He says:

> Here then we have a test. We can single out for examination narrow branches of phylogeny— small but persistent families or orders— and we can then see how much net change they undergo. In other words, is the original genus of the group eventually

> succeeded by others of quite different form (gradualistic model), or are the changes minor, so that even over long stretches of time no new genera, or only slightly different ones, emerge (punctuational model). (p. 83)

Stanley cites two examples:

> As a first example, we can consider the bowfin fishes . . . No more than two bowfin species are known to have existed at any one time . . . What has happened to the bowfin fishes during their long history of more than one hundred million years? Next to nothing! . . . The bowfins of seventy or eighty million years ago must have lived very much as their lake dwelling descendants do today. Thus, the punctuational view is favored. (pp. 83, 84)

An obvious truth that Dr. Stanley has not admitted is that the example he has given favors the creationist view even more than either the punctuationalist or the gradualist views. He continues:

> The lungfishes represent another example. These animals are well equiped to withstand droughts that occur where they live in South America, Africa, and Australia. Lungfishes breathe air, and the South American and African forms can also burrow into mud in order to sit out dry intervals. The evolutionary history of the lungfishes differs from that of the bowfins in that it includes an early history of rapid diversification. The lungfishes evolved at a high rate early in their history, when they also speciated rapidly. Then, beginning about 300 million years ago, they declined to a small number of lineages. At this low diversity they persisted to the present day. Meanwhile they evolved only modestly. Again, the punctuational model is favored (p. 84)

Put into fewer words, the author has said that lungfishes (which appeared suddenly in the fossil record) showed some microevolutionary changes (creationists agree that microevolutionary changes do occur— it is the macroevolutionary changes that are not supported by the fossil record) but remained lungfishes and have not changed much to this day. They are *still lungfishes.* And Stanley has erred— it is the creationist model that is favored.

When the author presents his views on human origins in Chapter seven, a small amount of evidence becomes conclusive to him. Stanley says: "As I will outline, we have conclusive evidence that the succeeding group of hominids, the australopithecines, were two-legged ground walkers." (p. 142) In speaking of *australopithecus africanus,* which evolutionists consider to be one of the australopithecines, he says:

> *Australopithecus africanus* has often been regarded as the direct ancestor of the human genus, Homo. Its existence spanned the interval from three million years ago . . . to perhaps 1.6 million years ago . . . *Australopithecus africanus,* like our species, was a fully upright creature. This we can see from various skeletal features, but most especially from its basketlike pelvis— a pelvis built along human lines to support the body above the legs. An ape's pelvis is more elongate, extending for some distance along the lower back . . .(pp. 142, 143)

Charles Oxnard, Professor of Anatomy at the University of Southern California, has pointed out that "anatomical relationships can't be simply established by subjective opinion."[4] In a book review in *Science,* Brian Shea of Northwestern University discussed Oxnard's multivariate statistical analyses in these terms:

> Oxnard has concluded that *Australopithecus* could not have been ancestral to Homo . . . his conclusions regarding morphology and behavior have been prophetic. His and his collaborators' claims that *Australopithicus* engaged in a form of locomotion quite different from that of modem *Homo* were ignored or ridiculed by many for years, but they have recently gained support . . . different workers using more traditional methods of comparative anatomy (Tuttle and Stern and Susman), as well as other techniques (Prost), have all . . . converged upon the view presented by Oxnard that australopithecines were more proficient in the trees and more different from modern *Homo* . . . than was previously believed.[5]

In commenting on Oxnard's work, Morris says:

> These multivariate statistical analyses were computerized and highly detailed, showing almost conclusively that the australopithicenes were some form of extinct ape, and that they did not walk erect.[6]

There is more to Stanley's argument, however. He says:

> What is known of the pelvic and limb bones of australopithecines has for some time been taken to indicate that these animals were fully erect in posture. This inference has been confirmed by Mary Leakey' spectacular discovery of tracks of fossil footprints more than three million years old. Apparently these were left by slender australopithecines treading across a fresh layer of volcanic ash in what is now Tanzania. The tracks look hauntingly like our own. (p. 145)

Careful analysis of this statement reveals that the only thing that has been confirmed is that some footprints have been found. No proof has been provided by Stanley or anyone else that the tracks were made by any of the australopithecines. Busse and Heikes, writing in *Science* said:

> The uneroded footprints show a total morphological pattern like that seen in modern humans . . . Spatial relationships of the footprints are strikingly human in pattern . . . The Laetoli hominid trails at site G do not differ substantially from modern human trails made on a similar substrate.[7]

When one of the foremost spokesmen for the punctuationalist movement illustrates the problems that evolutionists are having, it confirms what creationists have been saying right along. But more than that, his vain attempt to reconcile the fossil record to the punctuational form of evolution will result in more scientists than ever before questioning the whole theory of evolution. That indeed brings joy to the hearts of creationists.

References

1. Morris, H. M. and G. E. Parker. 1984. What is creation science? (public school edition), Master Book Publishers, San Diego, p. 156.

2. Morris, H. M. 1974. The troubled waters of evolution, Creation-Life Publishers, San Diego, p. 82.
3. Morris and Parker. *Op. Cit.,* p. 95.
4. *Ibid.,* p. 122.
5. Shea, B. T. 1984. Primate morphometrics, *Science,* 224:148-49. (Book review of The order of man, by Charles Oxnard, New Haven, CT.
6. Morris, *Op. Cit.,* p. 78.
7. Busse, P. H. and K. E. Heikes. Evolutionary implications of Pliocene hominid footprints, Science, 208:175, as quoted by Morris, Evolution in turmoil, p. 79, 80.

Before You Were a Baby by Mike J. Fritz. 1985. Victory Videos, San Diego, CA $39.95 (rental)

Reviewed by David Kaufmann*

This video and booklet show the complete development of a child from conception to birth. The learning method, which is recommended for sixth grade through adults, allows the viewer to see the video once in a relaxed mood. The viewer then watches the video a second time following along with the booklet. The third showing is without the booklet. This is followed by taking a 15 question quiz at the end of the booklet.

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Although there is no medical advisor listed in the credits, the visual and verbal presentation is essentially accurate. The only exceptions were statements that "the ovum is receptive to the sperm for about eight hours." Hole (1981) claims it is 12-24 hours.

"Every single cell of the thousands of millions that make an individual's body is an exact duplicate of the very first cell created by its mother and father." The latter statement incorrectly implies that a mature, developed, differentiated brain, bone, blood or any cell is structurally and functionally an exact duplicate of the zygote. The statement is only true before differentiation occurs.

The booklet and video make no ideological statements in their presentation with reference to birth control, abortion, sexual morals or venereal disease. It is truly a factual and neutral presentation suitable for public schools. It could also be used by Christian Churches or schools allowing them to add their specific theological viewpoint after the presentation.

Reference

Hole, Jr., J. W. 1981. Human anatomy and physiology, W. C. Brown, Dubuque, IA.

LETTER TO THE EDITOR

Egypt and Carbon-14 Dating

Part II of Vaninger's "Archaeology and the antiquity of ancient civilization: a conflict with Biblical chronology *CRSQ* 22:64-67) points out very expertly some of the problems with radiocarbon dating— problems acknowledged by many users of the method themselves. Unfortunately, certain information in the article is out of date and needs correcting. Vaninger's statement, "No C-14 tests on New Kingdom material have ever been made," (p. 65) was true as of 1962, but it no longer holds true. According to *Radiocarbon* (1965) 7:196, a piece of wood from King Tutankhamen's tomb was dated to 1030 B.C., which as an uncorrected date is more than three centuries too young. Other examples of New Kingdom radiocarbon dates are found in R. M. Derricourt (1971), "Radiocarbon chronology for Egypt and North Africa," *Journal of Near Eastern Studies* 30:281.

Three major problems exist with the C-14 dating of Egyptian materials:

1) CONTAMINATION BY MODERN CARBON. For example, reeds from Theban tombs, all of which were constructed during the reign of Rameses II, can have dates 1500 years too young if derived from mud bricks too close to the surface! See R. Berger and H. E. Suess, ed. (1979). Radiocarbon dating, pp. 601-12.

2) REUSE OF ANCIENT WOOD FOR FUNERARY ARTIFACTS. A papyrus deposited in the British Museum records the allegations that a piece of wood was stolen from the necropolis of Rameses II (19th Dynasty) in order to be reused in coffins dating to the late 20th dynasty. This document dating from the 20th Dynasty explains a modern discrepancy between a C-14 date of 905-805 B.C. for a coffin board from a tomb in W. Thebes and a date some 1300 years earlier from the coffin joint of the same coffin! See J. M. Weinstein (1984) Radiocarbon and some ancient Egyptian thievery," *American Journal of Archeology* 88:591-92.

3) THE DESTRUCTIVENESS OF THE METHOD ITSELF TO VALUABLE ARTIFACTS. Up until recently few Egyptian objects have been available for C-14 dating because once it is applied to a given object some 10-20 grams or more of organic content is irretrievably lost to archeology just for the sake of one C-14 determination. A new method of dating, the direct counting of C-14 ions, requires a sample size some 1000 times smaller than the old method and thus is considerably less destructive to irreplaceable objects. A good description of this method in R. E. M. Hedges and J. A. J. Gowlett, 1986, "Radiocarbon dating by accelerator mass spectrometry," *Scientific American,* Jan:100-7. Some of the initial reports by the AMS method in Egypt tend to be consistent with results from the old method. For example, a calibrated age of 2450-2900 B.C. was obtained for emmer wheat taken from the tomb of King Zoser of the third Dynasty, according to R. Gillespie, *et al.* (1985) "Radiocarbon dates from the Oxford AMS System," *Archaeometry* 27:237-46. This recent analysis avoids the three major stumbling blocks to a more successful dating of rare objects from Egypt, although it still does not have the accuracy for which archeologists had wished.

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