

Creation Research Society Quarterly

21st

Haec credimus:

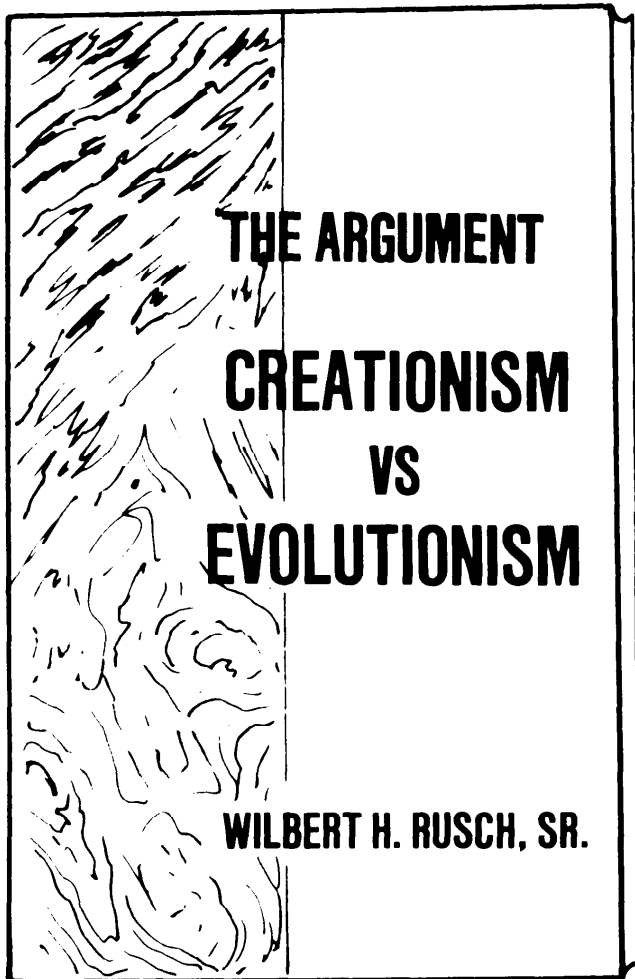
For in six days the Lord made heaven and earth, the sea, and
all that in them is and rested on the seventh. — Exodus 20:11

Year

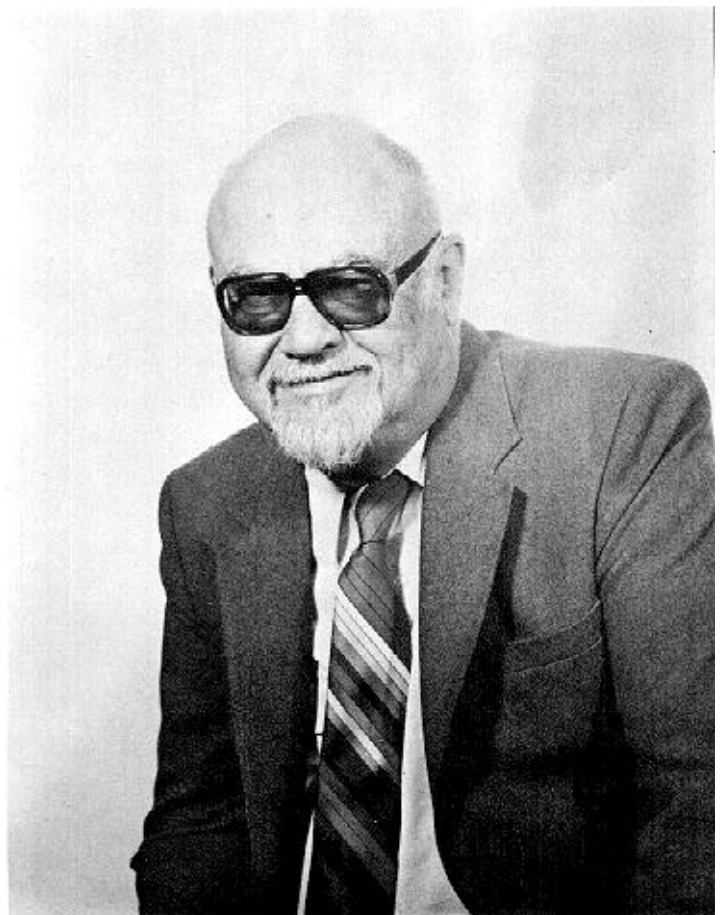
VOLUME 21

MARCH 1985

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NEW BOOK BY CRS PRESIDENT



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CREATION RESEARCH SOCIETY QUARTERLY

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VOLUME 21

MARCH 1985

NUMBER 4

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QUOTE

... A few men like Professor Sanborn realized that the issue was not so simple as it seemed, that, actually, the evolutionary theory was not taught in public schools or state universities by instructors sufficiently well educated to perceive its tentative hypothetical nature. Sanborn also recognized the growing disequilibrium in the modern educational curriculum: the student was not taught a coherent philosophical view of life; consequently he did not comprehend the relation of science to religion, of politics to ethics, of morals to metaphysics. He was increasingly under the tutelage of social scientists who interpreted man in terms of his physical nature. If moral values therefore were to be made subject to the evolutionary naturalism of Darwin, a loss of any traditional moral code would necessarily occur.

Cowan, Louise. 1959. *The fugitive group: a literary history*. Louisiana State University Press, Baton Rouge, pp. 206-7.

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QUOTE

These discerning comments help bring to focus a central aspect of Bacon's utopianism, and of a great strand of thought after him. The one great One is now totally immanent; it is mankind organized as the state; its instrument in issuing a new ultimate decree, a new predestination for man and nature, is technology and science. Science is thus cast into a messianic role and becomes progressively basic to utopianism.

Rushdoony, Rousas J. 1971. *The one and the many*, Craig Press, Philadelphia, p. 274.

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EDITORIAL COMMENTS

The Society is proud to present its latest selection in the technical monograph series, *The Argument* by Bill Rusch. A wide range of topics is covered in this unique book. Dr. Rusch also contributes to this Quarterly first with a tribute to the late Dr. John Grebe, one of the founders of the Society, and second with a review of the anti-creationist book *Evolution versus Creationism*. The editor also adds a brief addendum to the Rusch review defending the use of thermodynamic principles by creationists particularly where these have been disputed by naturalists.

The invited article is an excellent piece of detective work by Dr. John Klotz in delving into an original Charles Darwin manuscript. This well-written paper forms a trilogy with two previous works by Bill Rusch (CRSQ, 12:99-102 and 21:37-39) indicating that Darwin never embraced any of the tenets of Christianity in the last years of his life.

Magnus Verbrugge finishes his three-part series on Duyvene De Wit focusing on the influence of the writings of Herman Dooyeweerd. Also Michael Oard completes his comprehensive series on a uniformitarian theory of the ice ages. He points out many technical and philosophical defects of uniformitarian reasoning.

Dr. Tom Barnes develops his classical model of the hydrogen atom further. Dr. Barnes and Brent Becker

have an interesting interchange in the letters to the editor. I would like to see physicists contribute their comments to the classical vs. quantum physics discussion and present the philosophical consequences. A book review by Dr. Richard Pemper on Barnes' book, *Physics of the Future*, is included in this issue.

The very readable educational column of John Moore contains a superb section on one aspect of the scientific method, i.e., measurement. Also Dr. Moore carefully outlines a limitation of scientific methodology, i.e., the origin of the universe is beyond scientific investigation. What a person believes about the origin of the natural world is a position of faith, not knowledge.

There are several selections in Panorama of Science. The editor uses this section, originated by Harold Armstrong, to include technical briefs. Often ideas for laboratory and library research are offered. The overthrust bibliography is continued in this issue. It is hoped some Society members will investigate certain of these geologic formations. Excerpts from a letter by David Tyler to British Creationists, discussing the Experiment Station concept of CRS, reveal that other men realize the need for more study on the Creation model of science in an organized fashion.

Emmett L. Williams

INVITED PAPER

DARWIN'S RELIGIOUS BELIEFS

JOHN W. KLOTZ*

Received 2 March 1984; Revised 5 June 1984

Abstract

*In his autobiography entitled **Recollections of the Development of My Mind and Character** prepared by Darwin for his children there is an extensive section on the development of his religious views. Though Darwin never intended the autobiography for publication, it was subsequently edited and published by his son, Sir Francis Darwin. In editing, Sir Francis Darwin omitted the section on his father's religious views and instead presented them as brief quotations accompanied by his own summary. The original handwritten autobiography is in the Cambridge University library. The author has used this manuscript as the basis for much of this article. In his early life Darwin was a committed Christian. Later he was much influenced by his father who expressed his skepticism quite openly. Another factor was Darwin's understanding of the Genesis account as teaching fixity of species so that when he became convinced that new species could arise he came to believe that the Bible was unreliable. Thus, as he grew older he left the camp of orthodox Christianity and became an agnostic.*

Introduction

Darwin's religious beliefs evolved and, like so much of the real world, deteriorated rather than progressed as the theory of evolution might suggest. There was a period in his life when he was quite orthodox, but he died a skeptic and apparently an unbeliever.

That such a change should have taken place may well have been due in part to his family background. His mother was a Unitarian and attended the Unitarian Church in Shrewsbury on High Street. However,

Darwin and others of the children were baptized in St. Chad's Anglican Church, and later he seems to have attended the Anglican Church rather than the Unitarian Church. His mother, Susannah Wedgwood, who was his father's first cousin, died in July 1817 when Darwin was a little over eight years old and does not seem to have had too great an influence on Darwin's upbringing and particularly on his religious views.

More important was the influence of Darwin's father, Robert Waring Darwin, a remarkably successful Shrewsbury physician. Biographers have puzzled over the influence of Dr. Darwin on his son. Some have suggested an estrangement, but this does not seem to have been the case. Actually it appears as if Darwin

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and Mrs. Darwin is buried in the church yard there. There seems little doubt that Mrs. Darwin's views were more orthodox than those of her husband and that these were a major reason for Darwin's hypochondria, which almost all of his biographers acknowledge was due to the conflict between his religious views as reflected in his espousal of the theory of evolution and the more orthodox religious views of Mrs. Darwin. Darwin loved his wife very much, and it seems to have caused him a great deal of inner turmoil that he had advanced a point of view which she found objectionable from the standpoint of her religious beliefs.

What is it that brought the change from orthodox Christianity to skepticism and unbelief? It may be that Darwin was exposed to higher critical views at Cambridge, but this seems hardly likely in view of his orthodoxy at the time of the voyage of the Beagle. It is possible that he was disenchanted by the dryness and boredom of the Cambridge lectures in theology that he was required to attend. He writes, "During the three years which I spent at Cambridge my time was wasted, as far as the academical studies were concerned, as completely as at Edinburgh and at school."⁶

Doubts About Scripture

It is more likely that Darwin later came to recognize the incompatibility of his views on evolution with the Genesis account. This conflict was exacerbated by what he believed Genesis taught. He was convinced that the Bible taught fixity of species and was satisfied that once he had come to accept the idea of the development of new species in the course of the earth's history he was obliged to reject the Genesis account. The title of his book *Origin of Species By Natural Selection* shows that he was convinced that he had proved evolution because he had what he regarded as evidence for the development of new species.

To justify and support his point of view he began to look for reasons to question the entire Christian faith. In the remarkably frank *Recollections* he writes:

But I had gradually come by this time (i.e. 1836 to 1839) to see that the Old Testament, from its manifestly false history of the world, with the Tower of Babel, the rain-bow as a sign etc. and from its attributing to God the feelings of a revengeful tyrant, was no more to be trusted than the sacred books of the Hindoos, or the belief of any barbarian. The question then continually rose before my mind and would not be banished—is it credible that if God were now to make a revelation to the Hindoos, would He permit it to be connected with the belief Vishnu, Siva, etc. as Christianity is connected with the Old Testament? This appeared to me utterly incredible. By further reflecting that the clearest evidence would be requisite to make any sane man believe in the miracles by which Christianity is supported,—and that the more we know of the fixed laws of nature the more incredible the miracles become,—that the men at that time were ignorant and credulous to a degree almost incomprehensible by us—that the gospels cannot be proved to have been written simultaneously with the events,—that they differ in many important details, far too important as it seemed to me to be admitted as the usual inaccu-

(73)

constant recollection of a belief in God &
to much of children fearing so story &
perhaps an unlimited effect on them, ^{brain,} unless
fully developed, & more, that it will be as
helpful for them to turn off this belief
in God, as for a man to turn off
his instinctive fear & hatred of a snake.
I cannot pretend to throw the least light
on such abstract problems. The mystery of
the beginning of all things is insoluble to
us; & I for one must be content to believe
an agnostic.
(Edinb.)
From my diary, Jan 29. 1889, a sentence ^{from} ~~in~~ ^{of} ~~the~~ ^{the} ~~book~~ ^{to} ~~the~~
being false & untrue & then, Feb 14. 1892.—
You see how wide your notion, & still a good
notion as has been to all of you. I have

Figure 2. Page 73 from original Darwin manuscript.

racies of eyewitnesses—by such reflections as these which I give not as having the least novelty and value, but as they influenced me I gradually came to disbelieve in Christianity as a divine revelation.⁷

Darwin goes on to protest that he did not wish to give up his faith. He writes:

But I was very unwilling to give up my belief—I feel sure of this, for I can well remember often and often inventing daydreams of old letters between distinguished Romans and manuscripts being discovered at Pompeii or elsewhere which confirmed in the most striking manner all that was written in the Gospels, but I found it more and more difficult with free scope given to my imagination to invent evidence which would suffice to convince me. Thus disbelief crept over me at a very slow rate but was at last complete. The rate was so slow that I felt no distress and have never since doubted even for a single second that my conclusion was correct.⁸

Darwin explains to his children some of the reasons for his doubts. He writes, "The fact that many false religions have spread over large portions of the earth like wild fire had some weight with me."⁹ I quoted a reference to Hinduism earlier.

Darwin also seems to have been influenced by the higher criticism of his day. He was led by researchers in the area of Biblical studies to doubt the authority and authenticity of the Scriptures. He writes, "Beautiful as is the morality of the New Testament, it can

hardly be denied that its perfection depends in part on the interpretation which we now put on metaphysical allegories."¹⁰

Religious Beliefs

In his *Recollections* he deals with two other aspects of his religious beliefs, the existence of a personal God and immortality. He writes:

Although I did not think much about the existence of a personal God until a considerably later period of my life, I will here give the vague conclusions to which I have been driven. The old argument from design in nature, as given by Paley, which formerly seemed to me so conclusive, fails now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings and in the action of natural selection than in the course which the wind blows. Everything in nature is the result of fixed laws.

But passing over the endless beautiful and adjuncts which we everywhere meet with it may be asked how can the generally beneficent arrangement of the world be accounted for? Some writers indeed are so much impressed with the amount of suffering that they doubt if we look to all sentient beings whether there is more of misery or of happiness,—whether the world as a whole is a good or bad one. According to my judgment happiness decidedly prevails, though this would be very difficult to prove. If the truth of this conclusion be granted it harmonizes well with the effects which we might expect from natural selection. If all the individuals of any species were habitually to suffer to an extreme degree, they will neglect to propagate their kind; but we have no reason to believe that this has ever or at least often occurred. Some other considerations, moreover, lead to the belief that all sentient beings have been formed so as to enjoy as a general rule happiness. Everyone who believes as I do that all the corporeal and mental organs (excepting those which are neither advantageous or disadvantageous to the possessor) of all beings have been developed through natural selection or the survival of the fittest together with use or habit, will admit that these organs have been formed so that their possessors may compete successfully with other beings and thus increase in number. Now an animal may be led to pursue that course of action which is the more beneficial to the species by suffering such as pain, hunger, thirst and fear; or by pleasure, as in eating and drinking and in the propagation of the species, etc.; or by both means combined as in the search for food. But pain or suffering of any kind if long continued causes depression and lessens the power of action; yet is well adapted to make a creature guard itself against any great or certain evil. Pleasurable sensations, on the other hand, may be long continued without any depressing effects; on the contrary they stimulate the whole system to increased ac-

tion. Hence it has come to pass that most or all sentient beings have been developed in such a manner, through natural selection, that pleasurable sensations serve as their habitual guides. We see this in the pleasure from exercise, even occasionally from great exertion of the body or mind, in the pleasure of our daily meals and especially in the pleasure derived from sociability and from loving our families. The sum of such pleasures as these which are habitual or frequently recurrent give, as I can hardly doubt, to most sentient beings an excess of pleasure over misery, although many occasionally suffer much. Such suffering is quite compatible in the belief in Natural Selection, which is not perfect in its action, but tends only to render each species as successful as possible in the battle for life with other species in wonderfully complex and changing circumstances.

That there is much suffering in the world no one disputes. Some have attempted to explain this with reference to man by imagining that it serves for his moral improvement. But the number of men in the world is as nothing compared with that of all sentient beings, and they often suffer greatly without any moral improvement. A being so powerful and so full of knowledge as a God who could create the universe is to our finite minds omnipotent and omniscient, and it revolts our understanding to suppose that this benevolence is not unbounded, for what advantage can there be in the suffering of millions of the lower animals throughout endless time? This very old argument from the existence of suffering against the existence of an intelligent first cause seems to me a strong one; whereas, as first remarked, the presence of much suffering agrees with the view that all organic beings have been developed through variation and natural selection.

At the present time the most usual argument for the existence of an intelligent God is drawn from deep inward conviction and feelings which are experienced by most persons. But it cannot be doubted that Hindoos, Mohammedans and the like might argue in the same manner and with equal fervor of the existence of their one God, or many gods or as the Buddhists of no god.

There are also many barbarian tribes who cannot be said with any truth to believe in what we call God; they believe indeed in spirits or ghosts, and it can be explained how such beliefs would be likely to arise.

Formerly I was led by feelings such as this just referred to (although I do not think that the religious sentiment was ever strongly developed in me) to the firm conviction of the existence of God and of the immortality of the soul. In my Journal I wrote that while standing in the midst of the grandeur of a Brazilian forest 'It is not possible to give an adequate idea of the higher feelings of wonder, admiration and devotion which fill and elevate the mind.' I well remember my conviction that there is more in man than the mere breath of his body. But now the grandest scenes would not cause any such convictions and feelings to rise in my mind. It may be truly said that I am like a

man who has been color blind, and the universal belief by men of the existence of redness makes my present loss of perception of not the least value as evidence. This argument would be a valid one if all men of all races had the same inward conviction of the existence of one God, but we know that this is very far from being the case. Therefore, I cannot see that such inward convictions and feelings are of any weight as evidence of what really exists. The state of mind which grand scenes formerly excited in me and which was intimately connected with the belief in God did not essentially differ from that which is often called that sense of sublimity, and however difficult it may be to explain the genesis of this sense, it can hardly be advanced as an argument for existence of God any more than the powerful though vague and similar feelings excited by music.

With respect to immortality nothing shows to me how strong and almost instinctive a belief it is as the consideration of the view now held by most physicists, namely that the sun with all the planets will in time grow too cold for life unless indeed some great body dashes into the sun and thus gives it fresh life.—Believing as I do that man in the distant future will be a far more perfect creature than he now is, it is an intolerable thought that he and all other sentient beings are doomed to complete annihilation after such long continued slow progress. To those who fully admit to the immortality of the human soul, the destruction of our world will not appear so dreadful.

Another source of conviction in the existence of God, connected with the reason and not with the feelings, impresses as having much more weight. This follows from the extreme difficulty or rather improbability of conceiving this immense and wonderful universe, including man with his capacity for looking far backward and far into futurity as the result of blind chance or necessity. While thus reflecting I feel compelled to look to a first cause having an intelligent mind in some degree analogous to that of man, and I deserve to be called a Theist.

Note added later:

(“This conclusion was strong in my mind about the time as far as I can remember, when I wrote the *Origin of Species*; and it is since that time that it has very gradually with many fluctuations become weaker.”)

But then arises the doubt, can the mind of man which, as I fully believe, has been developed from a mind as low as that possessed by the lowest animals, be trusted when it draws such grand conclusions? May not these be the result of the connection between cause and effect which strikes us as necessary one, but probably depends mainly on inherited experience? Nor must we overlook the possibility of the constant inculcation of a belief in God on the minds of children producing so strong and perhaps an inherited effect on their brains not as yet fully developed, that it would be as difficult for them to throw off their belief in God as for a monkey to throw off its instinctive fear and hatred of a snake. I cannot pretend to

throw the least light on such abstruse problems. The mystery of the beginning of all things is insoluble by us; and I for one must be content to remain an agnostic.

Nothing is more remarkable than the spread of skepticism or rationalism during the latter half of my life.¹¹

Development of Skepticism

It is apparent that once Darwin had given up his acceptance of the authority of the Scriptures and the historicity of their reports he moved farther and farther from the faith and more and more into the area of skepticism. The rational arguments for the existence of God which may indeed serve as support for the structure of the individual's faith collapse once the foundation of Scriptural authority has been removed.

In his own mind Darwin was able to explain those observations which others believed supported the concepts of the existence of God and of the immortality of the soul on the basis of natural selection and natural laws. Indeed he feels natural selection better explains the existence of evil and suffering than does Scripture.

Still he found at least one major problem—the complexity of the universe, as quoted previously. Although this view of an intelligent “first cause” gradually dimmed over the years.

Darwin also had problems with origins. He speaks of “The mystery of the beginning of all things” which he rates as “insoluble.” He recognizes the limitations of the human mind; he is willing to reduce the significance and validity of arguments for the existence of God because of this limitation but he is unwilling to apply it to his own speculations regarding the development of living things. Rather interesting in the light of our present attitude over against Lamarckianism is his acceptance of the inheritance of acquired characteristics when he suggests that the idea of God may be due to “inherited experience” as mentioned above.

What about religious belief and morality? Darwin deals with this question too. Having given up Scriptures and a morality based on its principles and motivated by the Gospel, he turns to a work righteousness and a justification by the good life he has lived. He writes:

A man who has no apparent and ever present belief in the existence of a personal God or of future existence with retribution and reward can have for his rule in life, as far as I can see, only to follow those impulses and instincts which are the strongest or which seem to him the best ones. A dog acts in this manner, but he does so blindly. A man, on the other hand, looks forward and backwards and compares his various feelings, desires and recollections. He then finds, in accordance with the verdict of all the wisest men, that the highest satisfaction is awarded from following certain impulses, mainly the social instincts. If he acts for the good of others he will secure the approbation of his fellow man and gain the love of those with whom he lives; and this latter gain undoubtedly is the highest pleasure on this earth. By degrees it will become intolerable to obey his sensuous passions rather than his higher impulses which when rendered habitual may be almost

called instincts. His reason may occasionally tell him to act in opposition to the opinion of others whose approbation he will then not secure, but he will still have the satisfaction of knowing that he has followed his innermost judge or conscience. As for myself I believe that I have acted rightly in steadily following and devoting my life to science. I feel no remorse for having committed any great sin, but have often and often regretted that I have not done more direct good to my fellow creatures. My sole and poor excuse is much ill health and my mental constitution which makes it extremely difficult for me to turn from one subject or occupation to another. I can imagine with high satisfaction giving up my whole time to philanthropy but not a portion of it though this would have been a far better line of conduct.¹²

Conclusion

Darwin's introspection and frankness are interesting. They show an evolution, a change from apparent orthodoxy to skepticism and agnosticism. He bares his soul to his children in the handwritten *Recollections*. No doubt some of the seeds of doubt were planted

during Darwin's childhood, but much of this development came about after he had abandoned his faith in the authority of the Biblical record. He had made the human mind his authority, and it led him from orthodoxy to theism to agnosticism. Indeed it appears he might well be characterized as an atheist, a doubter of the very existence of God. His caution, however, and his recognition of the impossibility from a scientific standpoint of proving a negative led him to characterize himself as an agnostic which he says he is content to remain.

References

1. Darwin, Charles. *Recollections of the development of my mind and character*, Unpublished, pp. 64f.
2. *Ibid.*, pp. 73B, 73C.
3. *Ibid.*, pp. 61f.
4. Darwin, Francis, ed. 1912. *The Life and Letters of Charles Darwin*, Appleton, New York, I:39.
5. *Ibid.*, I, p. 45.
6. *Ibid.*, I, p. 40.
7. Darwin, Charles. *Op. cit.*, p. 62f.
8. *Ibid.*, p. 64.
9. *Ibid.*, p. 63.
10. *Ibid.*, pp. 63f.
11. *Ibid.*, pp. 65-73.
12. *Ibid.*, pp. 73A-73B.

ICE AGES: THE MYSTERY SOLVED? PART III: PALEOMAGNETIC STRATIGRAPHY AND DATA MANIPULATION

MICHAEL J. OARD*

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Abstract

This part completes the discussion of dating deep-sea cores by examining the new method of paleomagnetic stratigraphy. Too many unsolved problems exist to objectively date ocean sediments by magnetic reversals. Other possible mechanisms that may cause reversals in rocks or sediments are discussed. The dated oxygen isotope fluctuations are statistically analyzed for the controlling frequencies by power spectrum analysis. The predominant cycle matches the exceedingly weak eccentricity cycle in the Milankovitch theory. Even though this is claimed to prove the theory, it has caused even more serious problems. The question naturally arises of how order can be generated from the chaos of uncertainties and problems to produce their consistent results. It is shown that extreme bias in the astronomical theory has caused the manipulation of data by various means, and the "reinforcement syndrome" acts like a traffic policeman to keep data and researchers in order.

I) PALEOMAGNETIC STRATIGRAPHY

A) Introduction

Part I of this article showed how an uniformitarian ice age was practically impossible. However, many scientists now believe that the radiationally weak Milankovitch cycles have caused regular glacial/interglacial changes. The basis of this belief is the excellent statistical fit between dated oxygen isotope fluctuations of deep-sea cores and the three orbital variations. Part II examined this basis, showing that little really is known about the cause of oxygen isotope fluctuations. Before "absolute" dating methods are applied, cores are stratigraphically pigeon-holed into their geological context. Radiocarbon and the uranium series disequilibrium methods of dating are burdened with currently unsurmountable problems. This section continues with dating methods of ocean sediments.

The third main dating technique applied to Pleistocene deep-sea cores, as well as to other geological periods, is paleomagnetic stratigraphy, which is based on supposed reversals of the earth's magnetic field. Paleomagnetism has been primarily responsible for the revolution in the geological sciences caused by the plate tectonics theory.¹ It was not until the magnetic stripe pattern was discovered on the ocean bottom and related to changes in geomagnetic polarity as the ocean crust spread from certain centers that earth scientists accepted continental drift and plate tectonics. Like other new geological methods, it contradicted other more-or-less established geological beliefs until a compromise was reached. This occurred in the field of paleomagnetism when it was discovered that certain index fossils used to date the Miocene-Pliocene boundary at nine million years ago were dated at five million years ago by the new method.² Since paleomagnetism was considered more reliable, the Miocene-Pliocene boundary was changed to the new date, causing much

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previous literature to be updated. Paleomagnetism was also responsible for the revival and general acceptance of the old astronomical theory of the ice ages.³

B) K-Ar Basis and Biostratigraphic Control

Before the natural remanent magnetism (NRM) of a rock or sediment could be used for dating, the timing of the polarity reversals had to be known. This was accomplished in the 1960's on igneous rocks by K-Ar dating.^{4,5} Consequently, paleomagnetism depends upon the validity and accuracy of K-Ar dating: "... precision of K-Ar dating imposes serious limitations on the accuracy of reversal dating. Uncertainty about the true age of most reversals is substantial."⁶ Figure 1 is a very widely used version of the polarity time scale, which was originally published in 1969. There have been a few minor revisions since then. The current polarity epoch is called the Brunhes normal, and the previous reversed epoch is the Matuyama. The abrupt transition between them is currently dated at 730,000 years B.P., but has varied slightly in the past. This is a very important transition in Quaternary geology because dates in deep-sea cores are interpolated from this boundary. The dating of the core in Figure 1 (Part II) was done in this way.⁷ Every epoch has several sizable exceptions as shown in Figure 1. In the Matuyama reversed epoch, the Jaramillo and the Olduvai events are the two main exceptions, which are also important Pleistocene markers. Two other events have often been included during this epoch: the Gilsa event and the Reunion event. However, these are no longer used, having generally been incorporated into the Olduvai event. If the Olduvai event were not an exception, evolutionists would have a serious contradiction between K-Ar dating and the presumed age of the early man site at Olduvai Gorge.

As previously stated, "accurate" dating is a necessity within the geological sciences, and geologists are always looking for new techniques. Consequently, paleomagnetism was greeted with much excitement, because it promised "... resolution of many stratigraphic, paleontological, paleoclimatological, and other problems,"⁸ and "... because of the limitations of other methods."⁹ Technically speaking:

Magnetostratigraphy is not a dating technique. It only provides globally synchronous correlation planes, whose identification is possible by comparison with other stratigraphic or radiometric data.¹⁰

In other words, paleomagnetism is not an independent dating system, but depends upon index fossils and other dating methods. Just because a reversal is found in a rock or sediment, it does not mean it has a date because all reversals are similar. The rock or sediment must first be placed into its position in the geological column, and even when this is done, paleomagnetism cannot guarantee that there are no missing sections. In reality, the main geological control is index fossils,¹¹⁻¹³ and yet, it is hoped that paleomagnetic resolution will be able to:

... prove or to disprove claims about the appearance and disappearance of certain fossils at given absolute times ... since it is well-known that biostratigraphic markers such as fossils often unexpectedly exhibit diachronous (time transgressive) relationships.¹⁴ (parentheses mine)

It seems like there is confusion as to whether or not index fossils are really accurate time markers yet it is these index fossils on which so much in geology depends.

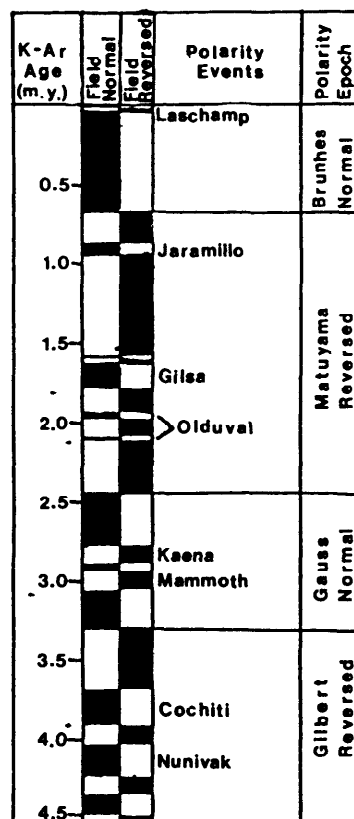


Figure 1. The polarity time scale.

C) Detrital Remanent Magnetism

The polarity time scale was developed on land. During this time, reversals in ocean sediments were being found, which are formed by a different mechanism. Igneous rocks acquire their magnetism (thermal remanent magnetism or TRM) while cooling through the Curie point, the magnetization lock-in temperature, which is usually cooler than the melting point. Sediments, on the other hand, acquire what is called detrital remanent magnetism or DRM. It occurs when magnetic grains, usually magnetite (but mixed with variable amounts of TiO_2 , haematite, or others), align themselves to a magnetic field while settling or resting on the bottom. The magnetized grains are believed to be very small, on the order of 10 microns or less in diameter, and spherical in shape. Consequently, the resulting DRM has a very low intensity, usually less than 10^{-4} gauss,¹⁵ which compares to the earth's magnetic field of about 0.5 gauss.

D) Many Unsolved Problems

On the surface, paleomagnetic stratigraphy seems straightforward. However, there are many problems beneath the surface with both igneous rocks and sediments. The following discussion will focus mainly on sediments, since this is more relevant to the subject of this paper. Barnes has discussed many of the prob-

lems associated with interpreting reversals in igneous rocks.¹⁶ In referring to paleomagnetic reconstructions that support continental drift, Rezanov says concerning paleomagnetism as a whole: "... many cardinal problems of the paleomagnetic method are still far from their ultimate solution, while others, the premises of the method, are still hypothetical."¹⁷ An article summarizing a meeting of the steering committee on paleomagnetism of the International Geological Correlation Program asks: "With all these problems, can paleomagnetic 'magic' still be taken seriously?"¹⁸ Since the participants have used the system to date and are very dependent on it, the answer, of course, was yes. Nevertheless, many serious problems remain unsolved.

1) THE ORIGINAL SEDIMENT ORIENTATION

The above summary article,¹⁹ written by Kukla and Zijdeveld, discussed three main problems with paleomagnetic "dating." The first is to establish the original position of the sample at the time of deposition. There are many factors which can make this a difficult problem. Generally, researchers just assume "... that their orientated samples precisely represent the layer at the time of deposition and dedicate lamentably little effort to testing whether this is really the case."²⁰ As discussed in Part II, ocean sediments are subject to all kinds of deformation caused by erosion, slumping, turbidity currents, plastic flow, earthquakes, etc. In fact: "... high-resolution seismic profiling has led to the recognition that large-scale submarine slumps and slides are more common than is generally believed, particularly near submarine fans and abyssal cones."²¹

"Such features can be detected in exposures but easily overlooked in cores."²² Consequently, the same old problem of finding undisturbed sediments is a disadvantage right from the start.

The coring operation itself can disturb the orientation of the sediment. Nonvertical penetration of the corer and the "suck in" of the sediments frequently cause misinterpretation. Often the corer rotates as it penetrates the sediment.

In the extreme case the shear stress may exceed the strength of the sediments, in which case the core may break, twist, and heal itself leaving almost no visible evidence of a break ... it is even possible for a piston corer to invert the order of flat lying beds.²³

Sudden, unexplained changes in magnetic direction in some cores are blamed on this twisting effect.²⁴ Sometimes the core is stretched and the top is sometimes missed.²⁵ Even in the handling and storage of cores, magnetic disturbances can occur:

The core may also be deformed in handling, cutting in segments and in storage. Freezing of cores as practiced by some palynological laboratories can produce large ice crystals which can damage the core structure.²⁶

Cores shrink while drying, especially those with a large clay content, and the DRM change direction.²⁷ However, another report says "... unreliable results were obtained if the sediment was too wet."²⁸ In other words, the magnetic effect of drying is unresolved.²⁹ Consequently, the many problems of knowing whether the sediment preserves the original orientation at magnetization, and whether the core has accurately re-

tained that orientation, may be enough to make paleomagnetic stratigraphy unreliable.

2) THE ORIGINAL GEOMAGNETIC FIELD

Even if the original sediment orientation at the time of magnetization could be found, a second major problem is to find the original geomagnetic field from the measured DRM of the core.³⁰ This is much more difficult than it seems. First, there are mechanisms inherent in the depositional process that can cause systematic deviations from the magnetic field. Second, non-erosional post-depositional processes can change the magnetic directions. Third, even after the sediment is well settled, other magnetic effects can alter the original magnetization.

As a magnetic grain falls through the water column, it tends to become aligned with the earth's field. However, as it settles on the bottom and comes to rest, several mechanisms can cause a systematic misalignment. These include the inclination error caused when the grains roll into depressions on the bottom, the bedding plane error due to a sloping bottom and a current rotation error caused by a grain's tendency to also become aligned with the current.³¹ The bedding plane and inclination errors supposedly are not detected in ocean sediments, although very real in lake sediments. Post-depositional remagnetization is the reason given for this surprising difference.³² In regard to the current rotation error, "Water movements in a basin are capable of producing large deflections which can be coherent at separate localities."³³ The above three processes should be quite variable and difficult to measure for the past.

Many non-erosional, post-depositional processes can change the original DRM acquired at the time of deposition. The common but variable effect of burrowing organisms is a major problem.³⁴ As a sediment becomes more compact and loses water, the magnetic minerals change direction a little.³⁵ Secondary mineralization causes a chemical remanent magnetism (CRM) which can vary considerably from the original direction.³⁶ Some believe that after the magnetic fabric of the sediment is disturbed, it becomes remagnetized, which is the permanent DRM actually measured in a core.³⁷ This "... is probably very complex and depends upon bioturbation, water content, rate of deposition, and subsequent diagenesis."³⁸ "Post-depositional" DRM as it is called will cause an unknown lag between the time of deposition and the final DRM.³⁹ This lag has been estimated to be as much as 150 cm in a core and has been invoked to explain contradictions between paleomagnetism and other dating methods.⁴⁰ Besides indicating a poor understanding of the process of DRM,⁴¹ a possible lag can be used as a convenient fudge factor.

Whatever the assumed mechanism of DRM, there are magnetic processes that can obscure the original magnetization. In other words, other magnetic fields are said to be "overprinted" on the original DRM from such sources as a different geomagnetic field, the earth's non-dipole field, the coring, handling and storage of cores, etc.⁴² Consequently, the measured DRM of the core can be very chaotic, or at least not what was expected. These secondary overprints must be eliminated, presuming one "knows" what must be re-

moved and what must be kept. It is generally assumed that overprints are "soft" and easily removed by placing the core in an alternating field of moderate intensity or by heating the sample. The magnetism which remains is assumed to be the "hard" original DRM. However, many of the basic assumptions of this method as well as for paleomagnetism as a whole are generally untested, and alternating field demagnetization leaves behind much undesirable magnetic components or noise, and thermal demagnetization isn't any better.⁴³ Kukla and Zijdeveld state:

No universal palaeomagnetic technique is available at present that can guarantee a complete removal of post-depositional magnetic overprint and the unambiguous identification of depositional polarity.⁴⁴

If a core fails to show a "coherent" pattern after demagnetization, it is set aside. For some the label of "unstable" is attached⁴⁵ because these cores "... give a complex paleomagnetic record with many apparent changes in paleomagnetic direction."⁴⁶ Also open to question is the assumption that the "hard" magnetism remaining after demagnetization is original, as stated by Tarling:

There is a tendency to assume that the component with the highest stability is, in fact, the oldest—yet this may simply reflect the presence of haematite that may have formed very much later than the rock itself.⁴⁷

Consequently, secondary overprints and the problem of their removal should make it very difficult to find the original magnetic direction.

3) MATCHING TO THE STANDARD POLARITY TIME SCALE

The third major problem in paleomagnetic stratigraphy is correlating the DRM pattern in the core after "demagnetization" to the standard polarity time scale as shown in Figure 1. This time scale is so deeply entrenched within the mainstream of research that it has become difficult to modify, and new results must pass rigorous tests.⁴⁸ Kennett indicates there are problems with the time scale and acceptance of the latest results is mandatory:

Understanding the nature of the polarity time scale has continued to evolve slowly, and the latest versions are not widely accepted although changes in the ⁴⁰K decay constants have required recalculation of the age of the boundaries, and later versions of the polarity scale are *required* to be adopted.⁴⁹

Some may think that deep-sea cores have been an independent confirmation of the polarity time scale worked out on land. However, the results of cores have actually been fit to the continental results: "All studies of cores that are presumed to cover the last 4 m.y. of earth history are *interpreted* with respect to the model presented above (which is the standard polarity time scale.)"⁵⁰ (emphasis and parentheses mine) Thus those cores or sections of one core which agree with the standard are retained, while the others are assumed in error. This is reflected in a comment made by Watkins:

It is clearly of value to have *all* paleomagnetic data from deep-sea cores published, rather than those in each core which match only the inde-

pendently proposed polarity histories available at the time of publication . . .⁵¹

The dating of a core by correlation with the standard polarity time scale is a very plastic procedure because the core or sections of a core can be made to fit almost anywhere. By invoking such fudge factors as hiatuses, reworking, lags and sedimentation rate changes, the DRM of a core can be made to match where desired. The subjectivity of the method is further indicated when the match is not perfect, but the results are accepted anyway. For instance, the Olduvai event, an exception to the Matuyama reversed epoch, is rarely found in deep-sea cores,⁵² and the second exception of that epoch, the Jaramillo event, is sometimes missing.^{53, 54} The same subjectivity occurs on land, as Bowen⁵⁵ indicates: "At Santerno in Italy the top of Early Pleistocene deposits has been correlated with the Olduvai Event by one authority, but another places them in the Bruhnes Epoch." An article on the Koobi Fora Formation, a fossil man site in Kenya, shows how fossils, K-Ar dating, and paleomagnetic stratigraphy can all be juggled to fit into a coherent whole by such mechanisms as remagnetization due to CRM from weathering.⁵⁶

Even the Bruhnes normal epoch, which should be the most stable and easily measured since it is the most recent, is riddled with anomalies. Cox⁵⁷ first suggested the theoretical possibility of short magnetic excursions in the Bruhnes epoch. Since then, many have been found, causing much consternation and searching for non-geomagnetic mechanisms. The following Bruhnes excursions have been suggested: 1) the Starno event about 3700 B.P.; 2) an excursion from the Great Lakes about 10,000 B.P.; 3) the Gothenburg excursion or "flip" around 12,400 B.P.; 4) the Laschamp event near 18,000 B.P. and shown in Figure 1; 5) the Mono Lake excursion about 25,000 B.P.; 6) the Mungo event near 30,000 B.P.; 7) an excursion at Biwa Lake, Japan, around 49,000 B.P.; 8) the Blake event near 110,000 B.P.; 9) the Biwa 1 event at Biwa Lake about 180,000 B.P.; 10) the Biwa 2 event near 295,000 B.P.; 11) a possible event around 340,000 B.P.; and 12) another possible event about 415,000 B.P.⁵⁸⁻⁶⁰ Some of these may be the same proposed event due to the dating problems. The Gothenburg "flip" is an example of the many problems with paleomagnetic stratigraphy. This event has been found in many different sedimentary environments from Sweden, Canada, the North Atlantic, New Zealand, Czechoslovakia, the North Pacific, the Gulf of Mexico, Japan, and France.⁶¹ However, it is missing from just as many places from all over the world, which indicates something is wrong somewhere. Some workers are skeptical of many of the claimed excursions:

A critical review of the proposed excursions reveals that although some excursions probably did occur, there is not yet sufficient evidence to confirm the existence of many of the claimed excursions.⁶²

This suggests a strong possibility of non-geomagnetic mechanism for excursions, and even for reversals.

E) Possible Non-Geomagnetic Mechanisms for Reversals

At this point, a slight digression from the main topic will be taken to consider other non-geomagnetic causes

for reversals. Natural Remanent Magnetism (NRM) seems to be common in rocks and sediments, and one-half of the NRM is reversed from the present geomagnetic field.⁶³ NRM has also been discovered in extra-terrestrial bodies, like the Moon, Mercury, and even in most meteorites,⁶⁴ which is an indication of other magnetization processes. There are many of these operating on earth which have been poorly explored because of the emphasis on geomagnetism. In fact, a new mechanism for inducing NRM was recently discovered in the laboratory while trying to demagnetize post-depositional overprints in cores. A new magnetic field was imprinted on the sample just because it was rotated. It was later discovered that this magnetization, called rotational or gyro-remanent magnetism, could be induced even "... whenever one sense of flip predominates ..."⁶⁵

A mechanism for changing the direction of magnetized igneous rocks is magnetostriction. This is caused by distortions of the rock due to shock or stress. Since there has been considerable earth movement in the past, magnetostriction may possibly explain many reversed rocks. Vestine says: "Perhaps, some of the interesting magnetizations of rocks stem from the effect of geologic stresses, rather than from changes in the geomagnetic field."⁶⁶ Some have suggested that the magnetization on the Moon is shock induced from meteorite or cometary impacts,⁶⁷ although others believe it was caused by an ancient magnetic field from a molten core.⁶⁸ Shock induced NRM from meteorite impact has been invoked to explain NRM in Precambrian rocks from Lake Superior.⁶⁹ Shock induced magnetization has even been demonstrated in the laboratory by simulating meteorite bombardments.⁷⁰ A large but transient magnetic field can be produced in a metal when fractured.⁷¹ It is interesting in this latter experiment that the fractured ends were reversely magnetized from each other and that lead rods showed induced magnetization even before breaking. This presumably was due to the very soft, plastic nature of lead.

Magnetostriction may account for the magnetic stripe pattern in the ocean crust as suggested by Barnes.⁷² This possibly could have resulted from the tectonic effects of the Flood. Many interpret Psalm 104:8 as referring to the Flood waters draining at the end as the mountains rose and the valleys sank down. These valleys would likely be the deep ocean trenches and abyssal plains, indicating a considerable and rapid drop in the ocean bottom. Physical evidence for this has been presented by Creationists.⁷³ Another indication of a large drop in the deep ocean basins is provided by the thin layer of sediment found there compared with many areas of the continents and continental shelves. In a global flood with rapid currents, tidal waves, etc., shallow areas would be dominated by erosional process while deep areas by deposition. This is because of the principle of continuity which requires a fluid to move faster through a constricted area and slower in an enlarged area. The rapid subsidence of the ocean basins would have caused significant magnetostrictive effects since the "... magnetostrictive effect is proportional to the applied compression ..."⁷⁴ Possibly the case with lead in the metal fracturing experiment⁷⁵ is similar to what happened at the end of

the Flood since the ocean floor basalt would be fresh and presumably hot and soft. The fact that the ocean crust is predominantly basalt and that the magnetic stripe pattern is so widespread and coherent may attest to a worldwide, simultaneous drop in the ocean basins.

The magnetic mineralogy and the changes in lithology down a core may have a significant influence on the magnetization of the sediment. These possibilities have not been adequately studied. In fact, there is "... virtually complete lack of knowledge and understanding of the magnetic mineralogy of the sediments ..."⁷⁶ Johnson and others confirm this: "... little is known about its origin, or even minerals in which the remanence resides."⁷⁷ Since the magnetic intensity is so low and scientists know so little about the magnetic mineralogy or even the process of DRM, it seems difficult to make valid conclusions on causes of magnetic reversals in sediments. Sediment lithology likely is responsible for the stability and/or the intensity of the magnetization. Opdyke originally found no correlation between magnetic intensity and changes in lithology.⁷⁸ However, a more recent study by Kent says: "Critical assessment of relevant data presented here and elsewhere from deep-sea sediment cores shows that a pronounced dependence of NRM intensity on sediment composition can occur ..."⁷⁹ If NRM intensity can be related to sediment lithology, why not the reversals themselves? There is some evidence of this, but most specialists do not believe this is the case.⁸⁰ In discussing short reversals or near reversals in lake sediments, Verosub and Banerjee say: "Most disturbing of all is the fact that the observed excursions are frequently observed near lithologic boundaries ..."⁸¹ Cores which have complex or coarse sediments are said to be poor recorders of the earth's magnetic field,^{82,83} which indicates in a negative sense some controlling influence from lithology. Cores taken close together give further indication of some lithological effect on direction.^{84,85} "Even in the same sedimentary environment the same paleomagnetic excursion is not recorded with the same paleomagnetic signature."⁸⁶ Lithology may also significantly affect igneous rocks: "Even records in igneous rocks may be dominated by rock magnetic factors ..."⁸⁷ Bowen reiterates: "Reversals in some igneous rocks are mineralogically (chemically) controlled, and some have been shown to have self reversal mechanisms."⁸⁸

Other possible causes for NRM and reversals in soft sediments include chemical remanent magnetism (CRM) and oxidation. The fact that intermediate directions are usually not found at reversal boundaries, and the directions are almost exactly 180° out of phase⁸⁹ suggests self reversal mechanisms and not geomagnetic causes. CRM is caused by chemical or mineralogical changes within the sediments. In a laboratory experiment, Bailey and Hale formed stable CRM of intermediate direction between the earth's field and a preexisting NRM. "Thus, stable, intermediate-direction CRMs acquired in past geomagnetic fields are a possibility."⁹⁰ In discussing magnetostratigraphy on sedimentary rocks, Butler and others say:

It should be recognized, however, that large normal components of viscous or chemical remanence can sometimes obscure or replace a primary reversed NRM. Thus, a certain amount of inter-

pretation must take place in obtaining a polarity log from a set of data.⁹¹

The extent of CRM in ocean sediments is unknown and it "... will be difficult if not impossible to distinguish from other remanences on the basis of a.f. (alternating field) demagnetization curves."⁹² (parentheses mine)

Oxidation of magnetic minerals is probably a more likely mechanism for reversals than CRM. There are many examples of rocks with reversed magnetism found adjacent to normally magnetized rocks of the same type. When the differences between them have been examined, the usual result is:

... that in the reversed rock the ironbearing minerals are more highly oxidized than in the associated normally magnetized rocks; in addition, there may be more titanium in the rocks with the reversed magnetization and there may be differences in the sizes of the grains in some minerals.⁹³

Oxidation has been shown to cause reversals in igneous rocks in the laboratory.⁹⁴ Oxidation is an explanation for reversals in red clay cores, which have been labeled unstable.^{95, 96} Smith says that if geomagnetism were the only cause of reversals, there should "... be no correlation at all between the physical, chemical or mineralogical properties of rocks and their magnetic polarities."⁹⁷ He goes on to say, however, that "... in recent years correlations have been discovered between the magnetic polarity and the state of oxidation of the magnetic minerals in certain rocks."⁹⁸ The reason for this relationship is unknown. It must be emphasized that if oxidation or some other mechanism besides geomagnetism were the cause of reversals, there would be no way to tell the difference: "... it should be noted that self-reversal is likely to be very difficult, if not impossible, to detect after the event."⁹⁹ In summary, there are other possibilities for reversals in soft sediments and igneous rocks. These should be explored further, especially since there are many problems in paleomagnetic stratigraphy, as well as severe theoretical difficulties with the physical mechanism proposed for reversals in the earth's interior.¹⁰⁰

II) SPECTRUM ANALYSIS AND CLIMATE CYCLES

A) Introduction

Once a core has been "dated" by any or all of the methods discussed previously $\delta^{18}\text{O}_s$ variations down a core are analyzed for their dominant cycles by power spectrum analysis. This measures the power or strength of each possible frequency, the strongest cycles standing out clearly as peaks on the graph. Figure 2 is a typical power spectrum analysis of $\delta^{18}\text{O}_s$ variations in deep-sea cores.¹⁰¹ Since the variance is on a log scale, each peak moving towards the longer frequency end of the scale becomes significantly stronger. The 106,000 year frequency, which would correspond to the eccentricity cycle, is clearly predominant. The peaks at 24,000 and 19,000 years relate to the precession cycle, which they surprisingly discovered can be broken into precisely the above frequencies! The remaining labeled cycle relates to the tilt cycle. Thus this close match has been offered as the main proof of the astronomical theory of the ice ages.

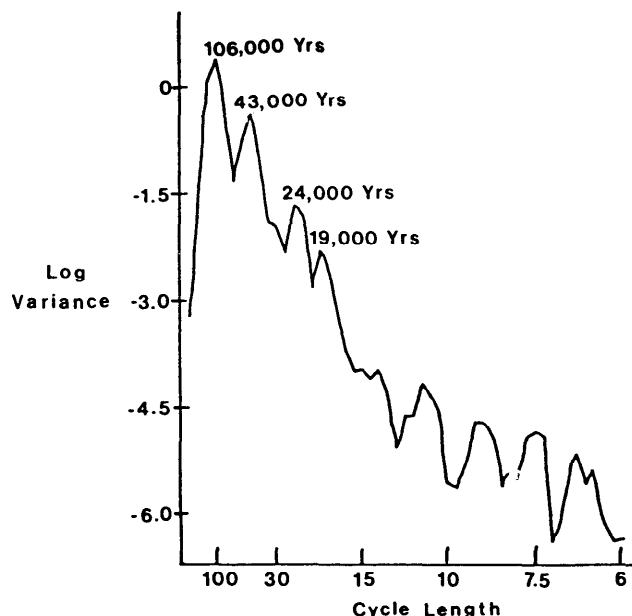


Figure 2. Power spectrum analysis of oxygen isotope variations from a combination of two cores from the Indian Ocean. Cycle length is in thousands of years.

B) The Mystery of the Eccentricity

Before paleomagnetism became established as a dating tool, the main Milankovitch cycle was considered the 41,000 year tilt cycle. This was even correlated to the oxygen isotope cycles in cores at one time with an almost perfect match.¹⁰² With the advent of paleomagnetic stratigraphy, the time scale of deep-sea cores was doubled and the main Milankovitch cycle had to become the eccentricity cycle: "Only with the advent of chronologies based on the Bruhnes-Matuyama magnetic reversal was the dominant climatic period in the $\delta^{18}\text{O}$ record identified as approximately 100,000 years."¹⁰³ However, this has caused a very serious problem, the significance of which exposes the subjectivity of the "solution" to the ice ages. Whereas the frequency of the 100,000 year cycle in deep-sea cores is very strong, the radiational effects of the eccentricity cycle is miniscule. The eccentricity cycle was never predicted to have any climatic consequences at all.^{104, 105} How can a mechanism that lessens radiation by at most 0.17 percent from the present value possibly cause an ice age, and not only that, cause it approximately 30 times in regular succession? Recognizing the problem, investigators are actively searching for a non-linear amplifying mechanism. The tilt and precession cycles are also too weak to cause ice ages, as shown in Part I, and they also need some amplification mechanism.¹⁰⁶

In the author's opinion, paleomagnetism has painted believers in the astronomical theory into a corner. The fact that they have accepted the dominant role of the eccentricity cycle shows their desperation to prove the theory. Since eccentricity also acts to modulate the precession cycle, which has a period about one-fifth that of eccentricity, some investigators are searching for ways in which the combination somehow triggers

an ice age with the eccentricity frequency. This has been difficult. One of the biggest problems is the precession cycle is 180° out of phase between the Northern and Southern Hemispheres, while ice ages are in phase.

Other difficulties have been encountered with the eccentricity cycle. This cycle is said to dominate deep-sea cores younger than 600,000 years, but is weak in older cores.¹⁰⁷ Another problem is why ice ages have not repeatedly occurred before the Late Pliocene since eccentricity and the other cycles would still be operative.¹⁰⁸ Continental drift cannot be invoked to start the Late Cenozoic ice age cycles due to a more favorable land-sea distribution because, according to the theory, little change has taken place since then. Sergin asks:

However, if external disturbances play a major role in generating climatic and glacial oscillations, an important question still arises: why were large-scale climatic oscillations with characteristic periods of 10,000 to 100,000 years absent during the last 100 million years while changes in the earth's orbital parameters were approximately the same?¹⁰⁹

C) The Proliferation of Cycles

When a new result is published, it usually seems straightforward. However, if it is not firmly established, subsequent information usually brings contradictions or further difficulties. These are often incorporated somehow back into the theory, if the theory is considered well established, as will be discussed in a later section. Further difficulties have arisen with the astronomical theory of the ice ages in that other frequencies besides the main ones have recently been showing up.¹¹⁰ The Milankovitch cycles were said to account for only 25 percent or less of the variation in $\delta^{18}\text{O}_s$ cycles in the key paper of Hays, Imbrie, and Shackleton,^{111, 112} although some believe it is really closer to 10 percent.¹¹³ This leaves much variation unaccounted for due to either noise or other cycles. Berger says that because of the many series expansion terms in the celestial mechanics equations, there are many minor Milankovitch cycles. These are 15,000 and 50,000 years for the precession; 21,000, 31,000 and 54,000 years for the tilt; 59,000 and 64,000 years for a combination of precession and tilt; and 95,000 and 123,000 years for the eccentricity.¹¹⁴ Kominz and others report that occasional cycles of 50,000 and 30,000 years, corresponding to the weaker tilt frequencies have been found.¹¹⁵ Coreau reports frequencies of 64,000, 30,000 and 17,000 years from the spectrum analysis of $\delta^{18}\text{O}_s$ variations of the past 730,000 years.¹¹⁶ With all the possible secondary Milankovitch cycles and the discovery of some of them, one wonders if any cycle from deep-sea cores can be accommodated into the theory.

III) ORDER FROM CHAOS

A) Introduction

It has been shown that the interpretation of $\delta^{18}\text{O}_s$ fluctuations and the dating methods of deep-sea cores are based on many poor assumptions with many variables, unknowns and serious problems. Therefore, it should be impossible to make any objective sense out of the chaos. However, earth scientists have been able

to put it all together into what seems like an impressive order. Even cores from different oceans look consistent. This has been offered not only as justification for the various assumptions and methods, but also as "proof" of the astronomical theory of the ice ages. How do they arrive at such good results? In other words, how do they produce order from chaos? This question has wider application to historical sciences and the creation/evolution controversy, but will be kept within the scope of this paper. The production of seemingly consistent results in the face of circular reasoning has justified the geological column and the theory of evolution in the minds of some scientists.¹¹⁷ It is the purpose of this section to take a deeper look at the "good" results and answer this question.

B) Extreme Bias

1) THE PROBLEM

As previously stated, the astronomical theory of the ice ages has always had special appeal to earth scientists because it is likely the only ice age mechanism that is even possible to "prove" from historical geology.¹¹⁸ This has led to a subtle and sometimes not-so-subtle bias, which has resulted in a search for the data that fits. This has been alluded to previously. Everyone is biased to some extent, but extreme bias can lead to significant distortions of the available data and blind believers to contradictions.¹¹⁹ Perhaps the biggest problem with extreme bias occurs when it is not recognized as such, and the selected data is offered as the product of objective science. The strong belief of some scientists in the astronomical theory has motivated them to construct order out of chaos and "prove" their preconceived ideas. Some examples are in order to show that this is indeed the case.

2) EXAMPLES

Milankovitch believed in his work so strongly that when he was challenged because of its inconsistencies and small radiation effect, he confidently stated: "I do not consider it my duty to give an elementary education to the ignorant, and I have also never tried to force others to accept my theory, with which no one could find fault."¹²⁰ When he first published his radiation curves in the 1920's, they were said to fit neatly into the four-ice-age chronology worked out before by Penck and Bruckner.^{121, 122} As things usually turn out in historical sciences, their work was later revised by Eberl and others who discovered that some gravel terraces in the Alps were actually compound terraces. It is especially noteworthy that the revised model fit even better: "But the revised version of Penck and Bruckner's climatic curve seemed to match the details of the radiation curve even better than before . . ."¹²³ The reason for this was because Eberl was very biased towards the Milankovitch mechanism and hence found the evidence to "prove" it: "In passing it must be noted that Eberl (1930) was heavily influenced by the ideas of Milankovitch."¹²⁴ It was this agreement that at one time swayed European geologists in the 1930's and 1940's into belief in the Milankovitch mechanism (which has happened again today). They not only were fitting data to the theory, but were also dating by the theory! Milankovitch proudly stated: "A constantly increasing number of scientists undertook to classify the . . . sediments according to the new method, to connect them with the radiation curves and to date

them by means of the latter."¹²⁵ This is confirmed by Mitchell: "Indeed, the Milankovitch chronology has sometimes been applied as a tool for absolute dating of the Pleistocene chronology itself."¹²⁶ Bowen adds: "His data was used as the basis for a chronology, and geological evidence was fitted into the pigeon-holes of his theoretical cycles."¹²⁷ Now that the four-ice-age scheme is defunct, it is obvious that all previous attempts to match this system to the astronomical theory of the ice ages was due to extreme bias.

During the 1950's and 1960's, when most scientists were disillusioned with the theory, a few influential scientists were trying very hard to prove it. One of these was Cesare Emiliani, who pioneered the $\delta^{18}\text{O}_s$ system in deep-sea cores. His chronology, which was heavily weighted towards only one core,¹²⁸ was the standard for about 10 years. It was composed of four Quaternary ice ages with a total length at one time of only 300,000 years. His chronology agreed right from the start in 1955 with the Milankovitch radiation curve for 65°N latitude.^{129,130} He had a near perfect fit with the tilt cycle, as previously mentioned.¹³¹ He even found evidence for Penck and Bruckner's great interglacial, which no longer is in vogue.¹³² His chronology has since been totally abandoned. His extreme bias is now obvious.

In the 1960's Erickson and Wollin developed a substantially different Pleistocene chronology that competed with Emiliani's chronology.^{133,134} It was based on microfossil analysis in deep-sea cores. The Quaternary in their scheme was 1,500,000 years long because they believed Emiliani's system was "... improbably short to encompass all the sum of small changes that must have gone into the making of Homo Sapiens from his ancestral species of the earlier period."¹³⁵ In other words, they were biased for a longer Pleistocene because of their belief in the evolution of man. However, they did not believe in the astronomical theory of the ice ages and felt their chronology did not support it. They echoed the bias of other researchers at that time when they sarcastically stated: "If the elastic chronology of the astronomical theory can be stretched from 300,000 to 600,000 years, why not draw it out to 1,500,000 years? The answer is, it will be — but not by us."¹³⁶ They were correct, it was incorporated as Mitchell says in this context: "A connection with the Milankovitch variations can still be maintained . . ."¹³⁷ This was done by comparing their chronology to the Milankovitch radiation curve at 40°N instead of the traditional 65°N, another indication of the plasticity of the theory as Erickson and Wollin stated. As time went on, their chronology was greatly revised. It was realized that the main foraminifera species used in their analysis was not as good a climate indicator as hoped. They had used 34 cores to construct their scheme. Of these, thirteen were later paleomagnetically dated and found to be out of place or compressed in time too much.¹³⁸

Another strong and influential believer in the astronomical theory is Wallace Broecker, a geochemist from Lamont-Doherty Geological Observatory, which is probably the most influential institution favoring the theory. Back in 1966, he had no doubts in the theory and even highlighted an article in Science by confidently stating: "Changes in climate occur in response

to periodic variations in the earth's tilt and precession."¹³⁹ Part of reason he found such a good fit at that time was because he "... attempted to reconstruct the average isotopic temperature curve of the deep-sea cores by assigning empirically relative weights to various orbital factors."¹⁴⁰ (emphasis mine) His bias is evident. The chronology he used in 1966 is now out-of-date and thanks to paleomagnetism, climate variations are now thought to occur mainly in response to eccentricity, and not to the other two cycles.

With such extreme bias, it was only a matter of time before such influential scientists would eventually "prove" the theory. In order to do this, a fair amount of data doctoring had to be done. Imbrie and Kipp reported at a conference held in 1969 that a specimen analysis of a core produced a 100,000 year cycle, but the other two "expected" cycles were missing, being replaced by other frequencies. Undaunted by this, they mentioned ways to solve the "problem," including adjusting the assumed sedimentation rate.¹⁴¹ Glacial and interglacial stages are numbered starting with the present interglacial (see Figure 1, Part II). In the same conference, Broecker dated the stage four and five boundary at 75,000 years B.P.

... on the hypothesis that the sharp cooling separating stages 5 and 4 was caused by the summer insolation drop between the warm peak 82,000 years ago and the cold peak 70,000 years ago in the astronomical curve.¹⁴²

Consequently, these few quotes indicate that much data doctoring was occurring with a strong bias towards the astronomical theory, and this was at a time when the theory was not generally accepted.

Nowadays, the astronomical theory of the ice ages is considered so well established that many scientists are dating and "tuning" their results from deep-sea cores to the radiation curves.^{143,144} Imbrie and Imbrie's climate model published in 1980 used the "known" climatic response of the Milankovitch mechanism to develop their model.¹⁴⁵ Morley and Hays fine tuned their standard chronology in 1981 by adjusting their $\delta^{18}\text{O}_s$ data, especially after 300,000 years ago, to the Milankovitch radiation curve.¹⁴⁶ Moore and others say that the tuning of the time scale to conform to the Milankovitch mechanism is a valuable tool to correct deep-sea cores for hiatuses, distortions, and sedimentation rate changes.¹⁴⁷ We have come full circle again by using the astronomical theory to date and fine tune, and the current extreme bias will effectively shield the theory from contradictions for a long time.

C) Intercore Correlation and the Sedimentation Rate

1) CURVE MATCHING

The author has shown that extreme bias produced the "proof" of the theory. In this section, I will explore just how this bias can actually transform data to fit preconceived ideas and produce consistent results with many cores. It is not possible to apply all the previously mentioned dating methods to a core. Usually, just one or two methods can be used, and sometimes none. Often a core is not "old" enough to pass through the Bruhnes-Matuyama reversal boundary, and therefore paleomagnetism cannot be applied. Often the top of the core is missing or disturbed or there is no suitable material for radiocarbon dating. Consequently, most

of the dating of deep-sea cores is actually done by simple curve matching of particular variables, especially oxygen isotope fluctuations to an assumed standard curve. Emiliani says: "... curves representing these parameters may allow the precise correlation of cores collected even on the opposite sides of the earth..."¹⁴⁸ Broecker states: "Direct ties between pollen curves and the glacial record are rare and hence, as in the case of ocean cores, correlations must be accomplished largely by curve matching."¹⁴⁹ (emphasis mine) It is common practice to match a particular core to a few available standard cores, which have been extensively analyzed and are the "pick of the lot." The core presented in Figure 1, Part II, is one of the chosen few, which has been influenced by the astronomical theory of the ice ages. Therefore, it is not surprising that consistent results from many cores are obtained by curve matching.

2) CORE JUGGLING

The method of actually making the curves match is first to shift the dates they do have, since the dating schemes are very plastic; assume missing sections in the core; change the sedimentation rate where convenient, since this is really not known; and assume reworking when the fossils do not match. A missing section or hiatus acts to stretch the core, while changing the sedimentation rate expands or contracts it. Reworking can also act to compress the core. Thus any curve can be made to match any other by these mechanisms. Opik says:

The writer has also shown that, with an arbitrary change in the time scale and but slight adjustments in the individual dates (much smaller than the error of observations), almost any set of fluctuating phenomena, such as rainfall at an arbitrary locality, can be brought into perfect agreement (as far as the highs and lows are concerned) with another fluctuating set, including the astronomical curve of solar radiation in the northern hemisphere.¹⁵⁰

Bowen affirms:

... all such climate curves, for whatever data, may be stretched or contracted, so as to match the available, or new, dating evidence. Many such curves have been replotted using dating assumptions different from the original work... Within the constraints of their radiometric tags, which are unfortunately often equivocal, all climatic curves are elasticated to some extent.¹⁵¹

Watkins adds further: "It is also important to realize that correlation of any parameter within the cores can be a forced correlation, in that inferred sedimentation rates can be varied."¹⁵²

The degree to which cores are juggled is indicated by the following statement: "... individual cores all contain sedimentation rate changes and many small hiatuses..."¹⁵³ Emiliani says much the same thing: "... these correlations also reveal wide differences in sedimentation rates between distant regions as well as appreciable changes in sedimentation rates through time within the same region."¹⁵⁴ In a dispute over different Quaternary dating systems, Broecker and Ku criticize Rona and Emiliani's composite chronology¹⁵⁵ for using variable sedimentation rates: "In core P6304-9 sedimentation occurred for the top 2 m at the rate

of 3 cm per 1000 years and for the next 2 m at the rate of 6 cm per 1000 years."¹⁵⁶ Emiliani and Rona charge in a response to the above criticism that Broecker and Ku changed their original dating on core V12-122 by about 25 percent to match the dating of Barbados coral reefs. This was done by changing the sedimentation rate in the core.¹⁵⁷ Consequently, the results of deep-sea cores have been juggled by various means to make them agree with each other and with the Milankovitch radiation cycles.

D) The Reinforcement Syndrome

1) DEFINITION

If all the above is true, why have not more objective scientists challenged the results of deep-sea cores and the statistical correlation between $\delta^{18}\text{O}_s$ cycles and the astronomical theory of the ice ages? In fact, why is so much supporting evidence being produced lately?¹⁵⁸ For example, scientists have recently found Milankovitch cycles in the chemistry of a briny lagoon 250 million years old!¹⁵⁹ (This supposedly occurred at a time when the main mechanism for translating radiation curves into geological cycles, that is through ice volume, cannot be invoked. Consequently this result raises some serious questions.) The answer, this author believes, is due to the "reinforcement syndrome,"¹⁶⁰ which is an outgrowth of extreme bias. This concept was developed as a possible explanation for the many paleomagnetic excursions and anomalies that were creeping into the literature.^{161, 162} Verosub summarizes how the reinforcement syndrome works:

The importance of the 'reinforcement syndrome' should not be underestimated. The initial report of a paleomagnetic excursion will encourage other workers to reexamine previously unexplained or disregarded 'curious' results and to reinterpret sedimentation rates so that the anomalous behavior seen by them is contemporaneous with the paleomagnetic excursion. Subsequent work will also focus on sediments of the same age. Reported excursions will then tend to cluster around a single date, whereas negative results showing no anomalous behavior will tend to remain unpublished because they are 'not interesting.' Thus the initial reports exert considerable leverage on the direction of future research.¹⁶³

This quotation indicates that there are many "curious" and "uninteresting" results that never become published. By picking-and-choosing and manipulating the data to be published, consistent results are produced which generally agree with previous research.

Unfortunately, this can lead to the syndrome in which scattered data are examined and the odd points that are near to previous observations are accepted for publication and the remainder appear, if at all, in the inaccessible appendix of a thesis... the data may well already have been subjectively selected to conform to previous data or models.¹⁶⁴

This is a vicious circle and the results become locked in with time, unless the amount of contradictory evidence becomes truly overwhelming or else a new generation of scientists arrives on the scene. Human psychology plays an important role in the reinforcement syndrome:

Superimposed on this is an important human element: it is much more reasonable to be able to generate both the energy and belief (faith?) required for publication of data confirming a discovery than to publish much negative data of a pedestrian nature. Thus the initial discovery is reinforced.¹⁶⁵

Even though the reinforcement syndrome was originally applied to paleomagnetism, it is "... an inherent weakness involved in experimental approaches and publication."¹⁶⁶ Hence it has a much wider application. It seems to be common in the historical sciences, where it is practically impossible to verify or falsify the results. It is this author's opinion that the geological column and the theory of evolution are supported by geological and biological data through the reinforcement syndrome.

2) EXAMPLE OF FOUR ICE AGES

Before the astronomical theory of the ice ages became popular, the previous four-ice-age scheme was just as strongly held. For a long time, data was funnelled into this concept, and it exerted tremendous influence on the interpretation of research. Four ice ages was consistently "verified" over and over again from scientific data because of the reinforcement syndrome:

Perhaps, the best known, at least the most significant, results of the 'reinforcement syndrome' in the geological sciences is the very firmly established concept of four glacial periods during the last Ice Age. The initially defined system was confirmed by many different studies.¹⁶⁷

The very different chronologies of Emiliani and of Erickson and Wollin, as previously discussed, were fitted into the assumed four-ice-age scheme. In fact, recently the Milankovitch cycles were even related comfortably into four ice ages. The reinforcement syndrome of four ice ages continued into the late 1960's until the evidence from deep-sea cores toppled it. Many lay people still believe there were four ice ages because old "facts" die slowly, but scientists now believe in possibly up to 30 or more during the Late Pliocene and Pleistocene.¹⁶⁸

3) THE NEW REINFORCEMENT SYNDROME

Earth scientists have broken away from the four-ice-age reinforcement syndrome and into another. This is the reinforcement syndrome of the astronomical theory of the ice ages. Much evidence has already been presented to show this. It is indicated by how well the results of deep-sea cores with all their assumptions, unknowns, variables and problems are fit into the theory, whereas they previously fit well into the four ice age scheme. It is evident when very few cores are good enough for extensive analysis and publication. Watkins indicates that cores are selected which fit, especially for the paleomagnetic time scale, and that with all the available cores, correlations between any two parameters are guaranteed.¹⁶⁹ Deviant results, most of which are never published, are explained away by many mechanisms. The sedimentation rate can be adjusted or a hiatus assumed, etc. The dating schemes cannot be applied very often and are plastic, so that most dating is done by curve matching. There are serious problems with the results, especially the insignificant radiational effects of the predominate cycle, not

to mention the near impossibility of a uniformitarian ice age in the first place. It is so popular now that most scientists believe the mystery of the ice ages has been solved, so that new evidence will be interpreted within the Milankovitch framework and contradictory results likely will never be published. The new reinforcement syndrome will probably last a long time and persuade most people, and order will continue to be generated from chaos.

IV) SUMMARY

This part of the article concludes an examination of deep-sea core dating by exploring paleomagnetic stratigraphy. This method, which depends upon other dating methods, attempts to set dates for a few levels in appropriate cores. However, the method has many serious problems. The original sediment orientation must be known, which is difficult because of sediment changes and the coring operation. The original geomagnetic field must be extracted from the chaotic measurements. The actual dates are provided by matching the magnetic measurements in the core to a standard polarity time scale, a very subjective procedure since all reversals look alike and the standard is riddled with anomalies.

After a core has been "dated," the oxygen isotope fluctuations are analyzed for their predominant periods by power spectrum analysis. The resulting frequencies just happen to match similar cycles of radiation in the astronomical theory of the ice ages. However additional problems have resulted. The predominant cycle is found to be the eccentricity, which was never predicted and which changes the radiation very little.

The good fit of the oxygen isotope data brings up an important question. How is order generated from the chaos of assumptions, variables, unknowns and problems? A closer look at the results in answering this question exposes their methodology, which can be extended to other aspects of historical sciences and the creation/evolution controversy. The desire to prove the theory causes an extreme bias, which results in the manipulation of data from deep-sea cores. In actuality, most cores are dated by simple curve matching to a few standard cores, which are the "ideal." The match is made very close by changing the inferred sedimentation rate and by invoking hiatuses where needed. "Re-working" explains many anomalies. Most scientists are then convinced by the "reinforcement syndrome," which further synthesizes new results into what appears to be a coherent whole. It worked for the previous four-ice-age scheme, and it will continue to generate order out of chaos and reinforce the astronomical theory as the solution to the ice ages.

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QUOTE

The vision of the world in which classical, orthodox Christianity has been nurtured and to which it has given expression is the only viable alternative to the shallowness of modern humanism and the radical absurdity of contemporary Marxism. But that vision needs contemporary expression in light of present circumstances, and forceful argumentation in modalities attuned to men and women raised in a culture devoid of intellectual or moral depth. Moreover, it needs to be unfolded in reference to modern man's most flagrant error, his fundamental misunderstanding of his own nature and his own place in nature. It is here that Christianity can be both corrective and constructive, for it views man as created in the image of God and therein receiving from his Creator a transcendent purpose which lends each human person and human history generally a dignity, value, and meaning which far surpass that envisioned by any other world view, ancient or modern.

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THE LEGACY OF DUYVENE DE WIT FOR CREATIONIST BIOLOGY: PART III — THE COSMONOMIC PHILOSOPHY: A CHRISTIAN ALTERNATIVE TO EVOLUTIONISM

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Abstract

This is Part III in the series of articles dealing with the life and philosophy of science of Duyvene De Wit, a Dutch biologist. This part specifically focuses on how De Wit was influenced by the writings of Herman Dooyeweerd.

A Posthumous Essay on Christian Philosophy

In previous articles I discussed the arguments, presented by the late Dr. J. J. Duyvene De Wit, a noted anti-evolutionary biologist, for the unscientific nature of evolution.¹

In this, the last of a series of three, I will discuss an article which he wrote and dedicated to Professor Herman Dooyeweerd on the occasion of the latter's seventieth birthday. It was published after De Wit's tragic sudden death.²

Its main thesis is that *the Christian scientist can no longer ignore the philosophical implications of his discipline*. For the biologist this comes through loud and clear because of the nature of evolution. It is not a scientific theory but rather is a philosophical and religious view of the genesis of the living world. Its basic doctrine is that of continuous transformation of species and its accessory theories are mutation and selection.

Because of its philosophical character evolutionism is challenged by the Christian biologist who knows philosophy and who seeks the religious presuppositions behind such a philosophy. It is in this context that De Wit wrote:

Professor Dooyeweerd's Christian philosophy has opened my eyes to the tremendous task which lies ahead for those who feel compelled to contribute to an intrinsic reformation of modern biological and anthropological thought.³

De Wit began by stating that Dooyeweerd has made important contributions to the life sciences and has introduced a new approach to the interpretation of scientific data which allows Christians to see a more coherent picture of reality.

Dobzhansky wrote that nobody has yet offered a satisfactory definition of life. The reason for that, says Dooyeweerd, is that life is usually thought of as a "something," a metaphysical "substance." Yet, life is not a concrete "something" that we can put under a microscope, but a *characteristic* displayed by the concrete living things we observe.

De Wit dealt with the term "species," as used in taxonomy. The Greeks saw fixed, unchangeable "ideas" underneath the variable phenomena of living things. Such unchanging ideas led to the concept of unchanging species. Linnaeus built his taxonomic edifice on this basis: ON WHAT HE SAW, not on metaphysical "ideas."

Evolutionary thinkers first set out to destroy this Greek notion of the fixity of the species since it conflicts with the concept of evolution. In its place came population thinking, which is more consistent with it.

Aristotle assumed an immanent substance, an "essential form" behind all observed living things. He saw this substance as the "formal cause" of the development of matter into living things and of eggs into mature organisms.⁴ This "cause" received the name of *telos* or *entelechy*, meaning "end goal" or purpose. The doctrine of seeing the end result of development as its cause became known as *teleology*. Dooyeweerd, wrote De Wit, demonstrated that this doctrine of teleology is of pagan origin. It is pure speculation without any scientific value and even defies simple logic.⁵

The Cosmic Philosophy of Herman Dooyeweerd as a Basis for Biological Science

In the place of this pagan thinking about concrete things Dooyeweerd formulated his theory of the *Individuality Structures* of things in which all living beings display an orderly development which is governed by the laws, obviously given for each species. The entire *cosmos* to which they belong is governed by God's *nomos*. (Hence the name "cosmonomic" for this philosophy.)

These groups of laws, specific for each species, are the regularities which the Lord set for His creatures. They are the laws which we scientists investigate. Examples are the manner in which organisms grow, reproduce and make proteins. These specific law-groups through which God governs the individual members of a species Dooyeweerd called their "individuality structures."

As the complement to his theory of individuality structures Dooyeweerd formulated the theory of *Encapsis*, which accounts for the amazing ability of living beings to "capture" inanimate material. Organisms manage to transform this material and make it perform physical and chemical reactions in an orderly fashion, an order, not found among atoms and molecules when placed outside a living organism. And yet these particles, atoms and many small molecules, retain their own individuality and structure while in "captivity."

Dooyeweerd was careful to emphasize that his theories were based on observations which all biologists can make. They contain no untestable speculations about substances and autonomous striving towards a goal, i.e. teleology, as believed by the Greeks and the vitalists of the beginning of our century.

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The Bankruptcy of Evolutionist Philosophy

In order to make evolution acceptable, its believers first had to destroy the basic modes in which we experience reality. They had to proclaim that the "life-mode" or "life-aspect" which we see is merely a complex form of matter in motion. The essential difference between dead and alive, which every human being intuitively experiences, had to be denied. Life was *reduced* to a special condition of inanimate matter. But that flies in the face of all scientific observation of reality. So, in order to make evolution acceptable, man must first *abandon the scientific method*.

Next, wrote Dooyeweerd, the individuality structures of living beings, the laws for their functioning which we abstract as the "laws of nature," had to go. *No laws, as discovered by experimental biologists, could have any permanent status*. They were mere transient peculiarities seen in organisms.⁶

It is obvious to even the most casual observer of life that each living thing functions under laws of great order and harmony. If life were to have arisen from atoms and molecules, which all function under their established laws of random interaction, these laws must have been suspended *for a time*. Thus the materialistic theory of abiogenesis suddenly requires something "supernatural": a miracle. In the past this was called a *spontaneous generation*. Its new name of abiogenesis does not make the theory less magical.⁷

The laws of genetics, wrote De Wit, have been found to affect only the inheritance and modification of characteristics *within* a species. Thus the theory of spontaneous transformation of one species into another one, regardless of the number of *assumed* spontaneous molecular misplacements in DNA requires the assumption of a concept such as "spontaneous generation" or a special "act of creation."

Guided by his doctrine the evolutionist *must* boldly take the jump into the unknown and declare that all species arose through such transformations. *Their faith left them no choice*. De Wit also gave evidence that points to the crucial role which the cortex and cytoplasm of the egg cell play in transmitting the characteristics of a species.

When the nucleus of a renal adenocarcinoma cell of an adult frog was transplanted to an enucleated, unfertilized frog egg, a nearly perfect frog embryo developed. He quoted Raven:

The group-specific fundamentals of the body plan which make the developing animal, e.g. into an anuran or a bony fish, are determined by factors residing in the cortex and the cytoplasm of the fertilized egg. Only after completion of the first phases of development, up to the beginning of gastrulation, do the nuclear genes begin to unfold their activity in order to establish the intraspecific characteristics of the developing organism.⁸

Experiments with grafting segments of cortex or cytoplasm have yielded similar evidence that confirmed the important role of the cortical membrane and cytoplasm of egg cells in heredity and the subordinate role of genes. Even the prominent evolutionist C. H. Waddington stated that many problems exist which cannot be solved by the methods of genetics and biochemistry.⁹

When all this knowledge of the role of cytoplasm in inheritance is confirmed and appreciated, wrote De Wit, theoretical biology will take a dramatic turn indeed. It effectively falsifies the "general theory of evolution" and it is entirely consistent with Dooyeweerd's theory of encapsis. In fact, through this theory of encapsis, biology can return to the investigation of reality without the inhibitions imposed on it by the unscientific mythology of the transformists.

De Wit noted that in the evolutionary "New Systematics," developed by Dobzhansky and others: "the role of the cortex in development is completely ignored because it does not support the basic tenets of the doctrine."¹⁰ It becomes clear why this would be so. Given the transmission of the species characteristics through the cortex or cytoplasm, the whole theory that man has arisen from animal ancestry through some random misplacement of his DNA bases becomes irrelevant.

De Wit discussed this theory in the footsteps of Dooyeweerd, who wrote in this same context that we cannot come to an understanding of man by starting from the animal. Rather, observed reality points the other way, that the animal can only be understood from *man* and *by man* as we all note by common sense. Would anyone be prepared to state that the ability to formulate scientific theories started with the animals and that we inherited the trick of analyzing reality from them through a random mutation of their genes? This type of absurd consequence clearly demonstrates the bankruptcy of evolutionist philosophy. De Wit ended his essay with:

In this essay it was attempted to indicate the impact of Dooyeweerd's Christian philosophy on present day evolutionary biological thought. I hope to have succeeded in showing that this philosophy poses a number of essential questions and problems which have never been raised before by the leading transformist biologists of today. Moreover, it presents an earnest challenge to theoretical biological thought which, for the sake of a sound development of the biological and anthropological sciences, can no longer be evaded.¹¹

Creationists United Against Evolutionism

One lesson we can draw from the work of J. J. Duyvene De Wit is that the road of the Bible believer is made narrow to tread by reason not only of the professed enemies of the Lord, but also his fellow believers in science who have embraced evolution as a "theory." These evolutionists have dug some deep pot-holes in which any Christian, not familiar with biology, can readily stumble.

Theistic evolutionists have tried to dress up this religious doctrine-turned-scientific-theory with the mantle of Scriptural authority. Any Christian who refuses to believe in evolutionism is condemned as an obscurantist or a reactionary and is accused of cutting the lines of communication between Christians and unbelievers. In effect these "Christian evolutionists" try to throw their creationist fellow believers out of the scientific community. We can also learn that the best apologetics is to be found in demonstrating that the evolutionist is not driven by his *scientific* accomplishments but by his *religious zeal*. He wants to prove that there need be no God.

We cannot "prove" that God exists and created the universe. Creationism rests on faith, even though it fits with all scientific data, which is something evolutionism cannot claim. We have strong scientific weapons, as De Wit maintained, and if we do not wish to blunt them, we must at all cost avoid:

- 1) *Unscientific* speculations.
- 2) *Unscriptural* speculations.

If we do involve ourselves in the above, we effectively cut our lines of communication with those to whom we wish to bring the good news such as well-meaning Christian scientists, unbelieving scientists and non-scientists alike.

The philosopher Russell recently expressed his indebtedness to the creationist movement and regretted that reformed scholars seemed to have dismissed creationism for two decades. He deplored the fact that no one had: "... built upon the excellent work of J. J. Duyvene De Wit in the area of the critique of evolutionism and the outlining of a new philosophy of biology."¹² The reason for this may be that many creationists suspect that philosophy is injurious to conservative theology and to sound science. Hence few evangelical scientists ever receive philosophical training.

Schuurman, a professor in cosmological philosophy, emphasized that as creationists:

... we should continue to work for an inner reformation of the scientific disciplines. ... Yet it is the weakness of reformational philosophy that among its proponents there are so few biologists and geologists. J. J. Duyvene De Wit has done much foundation work. ... Nevertheless there remains a *crying need* for Christian scientists who oppose the exaggerated claims of science and who at the same time reflect on the 'internal structure of the discipline.' It is a cause for joy that someone like Russell, coming from the school of creationism, asks for that.¹³

It is time now for believing scientists and philosophers alike to unite. Science cannot remain neutral when one discipline tries to absorb another. Physics

and chemistry cannot swallow up biology with the mechanist's claim that "life is nothing but a special case of matter in motion." It is time to get to the philosophical root of the reductionist efforts of humanism, masquerading as "science."

Let us take up the thread, spun by Duyvene De Wit in the sixties, and follow it right into the enemy camp, where the fabric of evolutionism is woven. Let us teach our brightest students about the scientific and philosophic arsenal we have, so that the work of Dooyeweerd, De Wit and others can be carried on. Let us join hands and together work for the clarification of the difference between pagan speculations which lead science to ruin and our children astray, and sober scientific work that leads us to recognize the glory of God's creation.

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A REPLY TO G. BRENT DALRYMPLE

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Five years ago, I published a comprehensive geologically-based critique of radiometric dating,¹ and this has drawn criticism from Dalrymple,² who is one of the nation's leading authorities on radiometric dating. I thank Drs. George Howe and Emmett Williams for bringing this matter to my attention. Let it be noted, right at the outset, that Dalrymple reacts as a typical anti-Creationist, i.e., using a superficial and sophomoric reading of Creationist views coupled with misleading and emotionalistic assertions. Just as he gave a highly self-congratulatory and rosy facade of radiometric dating at the Arkansas Trial, so he has—in such typically anti-Creationist fashion—erected and demolished a straw man of my paper.

Consider, first of all, Dalrymple's charge that results from Coast Range Batholith³ are not really anomalous. His initial claim that these results are really from Western Canada (not Alaska) and are cited (not initially reported) in my reference 42 are true but trivial. When an age-dated formation (in this case, the Coast Ranges Batholith) ranges beyond national borders, for the sake of brevity, I often list the nation of its most prominent or studied occurrence. Likewise, I have occasionally cited secondary sources if the primary source was not readily available, was more difficult for my readers to look up than the secondary source, or contributed to an unnecessary proliferation of references. It can thus be seen that Dalrymple's nitpicking is trivial and carries no weight.

Proof that results from the Coast Range Batholith are anomalous (although the authors Lanphere, *et al.*,

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finagle the geologic interpretation so as to avoid an otherwise anomaly) is now provided. Lanphere, *et al.*⁴ wrote:

The Bokan Mountain granite has been considered to be possibly Cretaceous or Tertiary in age, and the other granitic rocks possibly Cretaceous. Our data indicate a Late Triassic or Early Jurassic age for the Bokan Mountain Granite and an early Paleozoic, possibly Ordovician, age for the other granite rocks in the area.

It is obvious that here is a discrepancy between previously-held geologic-age interpretations based on field relationships and those based on the then-acquired radiometric dates. Where biostratigraphic data are firm, radiometric dates are explained away whenever in conflict with the former. In this case biostratigraphic data are not firm so it is the geologic relations that have been facily and conveniently re-interpreted so as not to conflict with radiometric dates.

Countless objections by anti-Creationists show that they have not bothered to read carefully the Creationist works they are criticizing! An ostentatious example of this is provided by Dalrymple's ludicrous charge that I had taken the 140-million year expected value out of thin air. Had Dalrymple read my work carefully before raising his hullabaloo, he would have seen that I got the expected values after the time scale of Braziliunas.⁵

Now, from the statements of Lanphere, *et al.*, we can see that the expected value was "possibly Cretaceous or Tertiary" before radiometric dates yielded a value corresponding with "Late Triassic or Early Jurassic." The *least* discrepancy is exhibited when the expected value is earliest Cretaceous which—according to the Braziliunas scale—corresponds to 130 million years ago. Allowance for a margin of error and uncertainty at system boundaries yields a value of 140 million years.

Dalrymple's superficial analyses and heroic demolition of straw men continue right on when he discusses my exposé of glauconite dating. Dalrymple notes that I have not discussed the experimental work on Evernden. So what! I actually do much better than that—I spend an entire chapter discussing ramifications of glauconite dating. This chapter provides another outrageous example where an anti-Creationist villifies a Creationist for allegedly ignoring something when in fact the Creationist discusses the *very thing* in the work under consideration. Dalrymple makes the 1961 Evernden experimental work to be something that accredits glauconite dating or something I failed to discuss. In my chapter on glauconite dating I *explicitly* discuss heating of glauconites. I mention works *more recent* than Evernden's (Owens & Sohl, Morton & Long, etc.) and consider not only heating but also weathering, spontaneous recrystallization, etc. Is Dalrymple's implication that I am ignorant of these things based on flippant superficiality or outright dishonesty?

Another falsehood in Dalrymple's criticisms involves the claim that I failed to mention that most of Evernden's results "agree very well with the expected ages." This may be true in the case of Evernden, but most certainly is *not true* of glauconite dating as a whole. Again, Dalrymple has not really read my work, because on page 113 I *explicitly* discuss this matter. I

cite Obradovich and Peterman who estimate that only about half of *all* glauconite results agree within 10 percent of expected values.

Dalrymple presents Evernden's work as some kind of definitive experiment that puts glauconite dating on a firm footing. Nothing could be further from the truth! Consider the present (1983) situation, 22 years after Evernden's work, in the light of this description by Smith:⁶

In the reviewer's view, it is still not clear that criteria have been established which will enable a geologist to select those grains that will give ages close to the time of sedimentation. One measure of acceptability might be that the criteria *satisfy those critics who reject glaucony ages in timescale calibration*. A suitable objective test might be to use glauconitic sediments interbedded with, say, andesites and simultaneously date glauconites, zircons, and fresh amphiboles. (Emphasis added)

It can thus be clearly seen that neither Evernden nor anyone else in the quarter-century since him has provided a consistent set of parameters by which to rationalize away discrepant glauconite results. Smith's statements also show that there still are uniformitarian geologists who reject *all* glauconite results as being reliable age indicators.

There are numerous other topics on radiometric dating covered in my work which Dalrymple does not even touch, and these expose radiometric dating for the farce that it really is. While this reply is intended only to answer criticisms directed at my work, I cannot keep silent in the light of outright falsehoods by Dalrymple directed at other Creationists. Consider Dalrymple's charge that John Moore thinks that the Rb-Sr dating method is discarded. While perhaps Dr. Moore should have expressed himself more clearly on the matter, what he meant was that Rb-Sr mineral results are no longer considered reliable (and many Creationists point out the same, but are well aware of the fact that the Rb-Sr isochron method is still used. Other Creationists, myself included,⁷ have refuted Rb-Sr isochron results). The essential correctness of Moore's thinking is demonstrated in these statements by Snelling:⁸

Although ages were calculated in this way until the late 1950's, the resultant ambiguity, particularly for Rb:Sr ages which are very sensitive to the common strontium correction, resulted in the method being abandoned.

It is thus clear that Rb-Sr minerals (as opposed to isochron) dating has indeed been abandoned.

Dalrymple's deceptive claims continue right on when he asserts that the earth's presumed age of 4.5 billion years (B.Y.) is based on different agreeing results. What he conveniently does not mention is that Precambrian terranes typically give a spectrum of contradictory results and that there are even some results greater than 4.5 B.Y. which get explained away. Both factors have been discussed and documented.⁹ His citing of the Amitsoq gneiss is thus a typical example of the blatantly selective use of contradictory dates that is such a hallmark of radiometric dating. The uniformitarian geochronologist can thus select any result from 4.0 billion years and younger from contradictory

Precambrian results as the "age" of the earth, and explain away any younger and older results.

Uncertainties about decay constants are *not* trivial even though the uncertainties are smaller than in previous decades. This is evident in the following statements by the uniformitarian Paul:¹⁰

So how do we know that ^{238}U , for example, has a half-life of four and a half thousand million years? The answer is that we believe radioactive decay is always exponential, an assumption which has been tested repeatedly on short-lived radioisotopes, and hence all we need to know is the rate of decay of a known mass of ^{238}U to calculate its half-life. Even so the determination of half-lives is open to some error, and various different figures have been published for the same radioisotope. For example, two books I consulted in preparing this chapter gave the half-life of ^{87}Rb as 5.0 and 4.7×10^{10} years, respectively. The difference may not seem like much, but 0.3×10^{10} is three thousand million years which is roughly two-thirds of the age of the earth!

One can clearly see that Dalrymple's cavalier dismissal of uncertainties in decay rates would not be shared by Paul. Furthermore, the basic *assumption* of decay rates themselves is glaringly evident. From Paul's statements it is evident that uniformitarians are *assuming* that radioactive isotopes such as ^{238}U behave (and have always behaved) in the same way as radioactive isotopes whose radioactive decay can be followed empirically through several half-lives. Dalrymple's puerile quibbling with Slusher's discussion of ^{57}Fe is clearly a red herring.

In conclusion, none of Dalrymple's criticisms whitewash the pretensions of radiometric dating in any way.

Radiometric dating remains a mockery of scientific experimental technique because of its selective acceptance of results: multiplied assumptions coupled with gargantuan special pleading, rationalization of discrepant results, and *ad hoc* use of data. I doubt if there is any other field of science where results could be so selectively interpreted and in such cavalier manner. The label "intellectual fraud" which Dalrymple scurrilously affixes to scientific Creationism properly and so deservedly belongs to radiometric dating! Dalrymple concludes with an emotionalistic "sad day for humanity" if Creationism triumphed over (his self-serving definition of) science. Actually, it is a sad day for humanity that intelligent people are taken in by the parody of experimental science that is radiometric dating.

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TRANSFORMER ANALOGUE OF THE HYDROGEN ATOM

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Abstract

A classical electromagnetic model of the hydrogen atom was introduced in the author's previous paper, A Unified Theory of Physics.¹ The model consists of a spinning spherical proton and a revolving electron ring. Spectral radiation results from resonant vibrations of the electron and proton. The model behaves like a transformer in which there is no ohmic loss. The proton spin and the electron ring rotation form the primary and secondary currents. The mutual inductance stores some of the atom's energy. One of the forces required to establish the stable state and to yield the required free-vibrational frequencies is supplied by an interaction between the primary and secondary currents. Its computation involves the gradient of the mutual inductance, the variation of mutual inductance with distance.

Introduction

The new model of the hydrogen atom, described in reference 1, pictures the hydrogen atom as a spinning spherical proton and a revolving electron ring (Figure 1). The indentation in the electron ring is maintained by the combination of electric and magnetic forces that tend to pull the two bodies close together while still keeping the positive and negative charges separated enough so that they never touch.

The magnetic fields associated with these motions of the charges form a magnetically coupled system that is analogous to a transformer in circuit theory. The proton has a self inductance L_p ; the electron ring has a self inductance L_e ; and there is a mutual inductance M_{ep} between the two.

Outside the atom the proton has an intrinsic spin, but the electron has no spin when it is free and completely outside of any magnetic field. As the electron falls in toward the proton, under the influence of the electric attraction, it moves into the magnetic field of the proton. As one might expect from Faraday's induction law, an electric current is induced in the electron.

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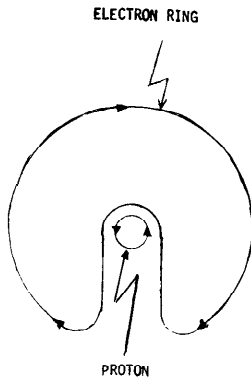


Figure 1. Model of the hydrogen atom.

It shows up as a spin of the electron's negative charge. The closer the electron gets to the proton the greater the spin until the electron opens into a revolving electric ring. This revolving ring has a magnetic field that induces additional current in the proton. That is to say, the induction from the electron's magnet generates some additional spin in the proton. This induction is similar to the induction between the currents in the primary and secondary of a transformer.

The Transformer Energy

The source of the magnetic energy added during the formation of the atom is the potential energy (P.E.) given up by the electron less the energy lost by radiation before the system settles down to its ground state. This radiated energy is precisely equal to the energy qV required to ionize the hydrogen atom. The values of charge q and ionization potential V are known to be $q = 1.602 \times 10^{-19}$ coulomb and $V = 13.599$ volts.

The equation that relates the source energy to the distribution of this generated magnetic energy is

$$\text{P.E.} - qV = L_p I_p^2 / 2 + M_{ep} I_p I_e + L_e I_e^2 / 2 \quad (1)$$

where $L_p I_p^2 / 2$ is the magnetic induction energy in the self inductance of the proton, $M_{ep} I_p I_e$ is the energy in the mutual inductance, and $L_e I_e^2 / 2$ is the energy in the self inductance of the electron. The currents I_p and I_e are the currents induced in the proton and electron during the formation of the atom. The total current in the proton is this current I_p plus the initial current I_0 that it had due to its intrinsic spin.

It is assumed that the proton and electron in the ground state of the atom have the same values of magnetic moment as that listed in the physical tables, namely, magnetic moment of the proton $M_p = 1.41 \times 10^{-26}$ and magnetic moment of the electron $M_e = 9.28 \times 10^{-24}$. The self inductance L_p of the proton is

$$L_p = (\pi \mu r / 3) \quad (2)$$

Equation (2) can be deduced from the following equations:

$$L = \Phi / I \quad (3)$$

$$\Phi = \mu M / 3r \quad (4)$$

$$M = qwr^2 / 3 \quad (5)$$

$$I = qw / 2\pi \quad (6)$$

The first equation follows from the definition of self inductance. The next two were derived in the book *Physics of the Future*,² as equations (10-14) and (10-11). Equation (6) gives the charge flowing per second in that closed path. Using $r = r_p = 1.02 \times 10^{-18}$ meters (m) in equation (2) gives the value of the self inductance of the proton

$$L_p = 1.35 \times 10^{-24} \text{ henry.}$$

An approximate value of the self inductance of the electron ring can be computed from the equation

$$L_e = 3.32 \times 10^{-6} l \quad (7)$$

where l is the length of the periphery of the ring. Assuming l is equal to the Bohr orbital length ($2\pi \times 5.3 \times 10^{-11}$ m), the self inductance of the electron ring

$$L_e = 1.11 \times 10^{-15} \text{ henry.}$$

Equation (3) is derived from the equation

$$L = 10^{-7} l [1 + 2 \ln(\Delta s / r)].$$

(See *Introductory Circuit Theory*, Ernst A. Guillemin, John Wiley, 1965, p. 213). The quantity $(\Delta s / r)$ was taken as the ratio of the radius of the circle of length l to the radius r of thickness of the ring. The thickness of the electron ring is obtained by assuming that the volume of the electron ring equals the volume of the classical spherical electron of radius 1.87×10^{-15} m. Dividing this volume by l yields the cross sectional area of the electron ring from which r is computed. Cross sectional ring radius $r = 5.12 \times 10^{-18}$ m.

Currents in the Transformer

The current in the electron ring is

$$I_e = 1.03 \times 10^{-3} \text{ amp.}$$

That is obtained from the knowledge that *the magnetic moment of a plane loop of current equals the current times the enclosed area*. The area is assumed to be equal to the area enclosed by the Bohr orbit, which has a radius of 5.3×10^{-11} m.

The potential energy is computed from the well-known equation

$$\text{P.E.} = 9 \times 10^9 q^2 / d \quad (8)$$

where d is the effective distance between the electron and proton charges. This distance between the electron ring and the center of the proton can only be estimated until the precise shape and spacing of the ring is known. As an approximation we assume that $d = 4 \times 10^{-11}$ m, which is roughly three-fourths of the Bohr orbital radius. Using that value in equation (8) the potential energy given up by the electron

$$\text{P.E.} = 5.77 \times 10^{-18} \text{ joule.}$$

The mutual inductance

$$M_{ep} = k \sqrt{L_e L_p} \quad (9)$$

where k is the coefficient of coupling. The coefficient of coupling depends on that fraction of flux that links the electron and proton. Making the assumption that $k = 0.25$ and using the known values of L_e and L_p , the value of mutual inductance in this model of the hydrogen atom is

$$M_{ep} = 9.68 \times 10^{-21} \text{ henry.}$$

All the variables in equation (1) are now known except I_p . Substituting the known values into (1) and simplifying, yields the quadratic equation

$$6.75 \times 10^{-25} I_p^2 + 9.97 \times 10^{-24} I_p - 3.59 \times 10^{-18} = 0.$$

The solution to this equation is

$$I_p = 2.31 \times 10^3 \text{ amp.}$$

This is the induced spin current generated in the proton. This induced current is over and above the intrinsic spin current I_0 .

Magnetic Force

Variations in the magnetic repulsion occur *during changes in the magnetic coupling* associated with the oscillatory vibration about the equilibrium position of the electron. The repulsion force on the two coupled circuits in a transformer is

$$F = i_1 i_2 (\partial M / \partial x) \quad (10)$$

(See *Foundations of Electricity and Magnetism*, 1977, T. G. Barnes, equation (12-60) third edition, p. 270.) This force equals the product of the primary and secondary currents times the gradient (change with separation distance) of the mutual inductance M . This equation is valid for the hydrogen atom. The hydrogen atom is a *no-loss transformer*. In its stable state the "primary" and "secondary" currents continue to flow without dissipating energy, whereas the ordinary transformer *requires alternating current* to sustain the flow of current.

As seen in equation (9) the mutual inductance may be written in terms of the coupling coefficient k . This coefficient is a function of effective separation distance x (the axial spacing distance between an idealized transformer ring and the rest of the transformer). For theoretically perfect coupling $k = 1$ at $x = 0$. The coupling drops off rapidly with x . For illustrative purposes we shall assume that the coefficient of coupling is the following exponential function of separation distance

$$k = \epsilon^{-ax} \quad (11)$$

The transformer repulsion force may then be written as

$$F = i_p i_e \sqrt{L_e L_p} (\partial \epsilon^{-ax} / \partial x) \quad (12)$$

or simply

$$F = i_p i_e \sqrt{L_e L_p} a \epsilon^{-ax} \quad (13)$$

To put this in the form of Hooke's law equation (13) is differentiated, yielding change in force as a function of change in distance from the equilibrium position,

$$dF = i_p i_e \sqrt{L_e L_p} a^2 k_0 dx \quad (14)$$

where

$$k_0 = \epsilon^{-ad} \quad (15)$$

is the coefficient of coupling at separation $x = d$ which is the equilibrium state or ground state of the atom.

Using the previously assumed values: $k_0 = 0.25$ and $d = 4 \times 10^{-11} \text{ m}$ in equation (15), the value of the constant a is found to be 3.466×10^{10} .

The Hooke's law stiffness constant in equation (14) may be written as

$$K = i_p i_e \sqrt{L_e L_p} a^2 k_0 \quad (16)$$

We have seen that for the ground state of the hydrogen atom:

$$\begin{aligned} i_e &= 1.03 \times 10^{-3} \text{ amp} \\ i_p &= 2.31 \times 10^3 \text{ amp} \\ L_e &= 1.11 \times 10^{-15} \text{ henry} \\ L_p &= 1.35 \times 10^{-24} \text{ henry} \\ k_0 &= 0.25 \text{ and} \\ a &= 3.466 \times 10^{10} \text{ meter}^{-1} \end{aligned}$$

Using these values in equation (16) yields:

$$K = 27.7 \text{ N/m}$$

This is the magnetic stiffness for free translational oscillations of the electron about its equilibrium position in the hydrogen atom.

Radiation Frequency

The radiation frequency for this mode of vibration may be found from the well known mechanical resonant frequency equation

$$f = (1/2\pi) \sqrt{K/m} \quad (17)$$

Using $K = 27.7 \text{ N/m}$ and the mass of the electron $m = 9.1 \times 10^{-31} \text{ kg}$, yields the *radiation frequency* $f = 8.78 \times 10^{14} \text{ Hz}$.

In spite of the simplifying assumptions and approximations made for this spinning proton and revolving electron ring model of the hydrogen atom, the radiation frequency of this fundamental mode of oscillation lies within the Balmer series spectral range, the visible range of the hydrogen spectrum.

One of the assumptions should be pointed out. The magnetic force is not the only force, there is also the electric force acting on the electron. If one assumes that the spacial rate of change of the electric force is much smaller than the spacial rate of change of the magnetic force in the region near equilibrium, very little correction needs to be applied to the previous derivation.

In order to have a *restoring* force, which is necessary for oscillation, there must be a net force acting back toward the equilibrium position whenever the electron moves either outward or inward from the equilibrium position. The magnetic force is a repulsion force and the electric force is an attraction force. The magnetic force must dominate when the electron is below the equilibrium position. The electric force must dominate when the electron is above the equilibrium position.

The repulsion force ΔF below the equilibrium position is due to the increase in magnetic over electric force. The attraction force ΔF above the equilibrium position is due to the decrease in magnetic over electric force. In other words, the electric force is assumed to be relatively constant in that region. That is only an approximation since the electric force does vary, albeit at a smaller rate. Because of that change, perhaps the restoring force is somewhat smaller. A smaller restoring force means a smaller stiffness K .

Even though this derivation of the resonant frequency of oscillation is based on some rough approxima-

tions, it shows the reasonableness of this classical model of the hydrogen atom. Inclusion of the change in the electric attraction force in that region would have lowered the spectral frequency. Instead of the radiation frequency being $f = 8.78 \times 10^{14}$ Hz, it would have been somewhat lower. Recalling that the H_α spectral frequency $f_\alpha = 4.568 \times 10^{14}$ Hz it is reasonable to expect one of the fundamental modes of vibration to be lower than that obtained when the spacial variation in electric attraction was neglected.

This model of the hydrogen atom is a perfect radiator in the sense that it has no ohmic loss and has an extremely high Q. For an explanation of Q, see reference 1, page 61. This extreme efficiency assures sharp spectral lines and wave trains long enough to satisfy the phase coherence required in optical standing wave experiments. Much more work needs to be done before the precise configuration and force functions can be developed. It has, however, the potential for many modes of vibration within the hydrogen spectral range.

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EDUCATIONAL COLUMN

TEACHING ABOUT ORIGIN QUESTIONS: ORIGIN OF THE UNIVERSE

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Abstract

In the first article in this series (CRSQ 21:115-19) the author stated a positive, scientifically objective alternative to the "conventional wisdom" of a mechanistic, materialistic origin of the universe and life on the earth, and an animalistic origin of human beings. He listed support data, and demonstrated the validity of Total Creationism and Total Evolutionism as contrasting viewpoints about origins: (1) the former a set of ideas based upon belief in Eternal, Personal Creator God Who created all things, (2) the latter a contrasting set of ideas based upon the belief that all things derived from some Eternal, Impersonal Matter-Energy condition. Further he contrasted inquiries about the present involving scientific hypotheses and theories, and inquiries about the past involving unnatural singularities and speculation about what "could have been" or what "might have happened." This article contains discussion of specific examples and illustrations of the above points as applied to teaching about the origin of the universe.

Introduction

Total Creationism and Total Evolutionism are viewpoints about origins that involve belief in unnatural objects and/or events (singularities) that cannot possibly be submitted to scientific study. To protect the integrity of a pluralistic educational curriculum, both of these contrasting viewpoints about origins should be presented in the public schools to neutralize the current exclusive, monopolistic ideas of "evolutionary" origin of all things.

Of course professional scientists do not study the supernatural or the unnatural. Science, as a proper and orderly profession, entails specifically the direct and/or indirect, repeatable observation(s) of natural objects and/or events that occur or exist in the physical environment. Nevertheless professionally qualified scientists of the majority do present objective, scientific facts in support of Total Evolutionism; and, also, professionally qualified scientists of the minority do pre-

sent objective, scientific facts in support of Total Creationism, as listed in the December 1984 article in this series.

However, Total Evolutionism, as well as Total Creationism, relate to inquiries scientists make about the past, unnatural, non-repeatable aspects of life on the earth, about the solar system, and about the entire cosmos; such inquiries being quite different than inquiries scientists make about natural objects and/or events in the present. Because there is this discernable difference between inquiries in the present, and inquiries about the past, the purpose of this second part of the continuing series on "Teaching about Origin Questions" will be to show that limitations exist regarding any inquiries about the origin of the universe.

Importantly, in further introduction, is the very real problem in teaching about origin questions concerning the use of the term "hypothesis." In proper, orderly scientific work, a hypothesis must be testable, as numerous leading evolutionists have written repeatedly. Astronomers and astrophysicists quickly claim that they do formulate hypotheses about their natural environment.

But modern science teachers can state pointedly that no scientist has ever studied or been initially aware of any natural objects, first events, or prior conditions by which the universe supposedly came into existence. Astronomer Dr. Robert Jastrow has admitted this point

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repeatedly in various publications. Of course leading astronomers have propounded, and the prevailing majority of scientists have accepted at one time or another, certain basic thoughts relevant to the beginning of the universe, which are associated with "big bang," "steady-state," or "oscillating" concepts.

Nevertheless, with regard to creation/evolution discussions of the origin of the universe, clarity of understanding is gained if the modern science teacher insists that a hypothesis in proper, orderly science is testable, amenable to some direct or indirect study. Thus, one can only refer to a "Big Bang" *concept* as the most popular idea of scientists about the origin of the universe. No "scientific hypothesis" about some "big bang" is involved. Ideas of scientists about the origination and generation of the universe are *after the fact*. No prior study of a "big bang" explosion has ever occurred, nor will ever be possible according to present technology. (Some might still hope that a "time machine" will be invented.)

Cosmology and Cosmogony Defined

Because of the above situation, discussions of the origin of the universe should begin with the fact that all ideas of origination and generation of the universe must be recognized, necessarily, as part of *cosmogony*, and *not* directly involved with *cosmology*. Admittedly astronomers and astrophysicists currently want to include cosmogony "within" cosmology.

But this practice is quite regrettable with regard to rigor of communication and meaning; thus, the modern science teacher must demand *careful delineation* of the two terms, "cosmology" and "cosmogony." The very real distinction between cosmology and cosmogony is most instructive as a beginning point for discussion on the origin of the universe, since the distinction is a useful means of certifying specific limitations of scientists.

Today many astronomers and astrophysicists do not acknowledge rigorously the difference between cosmology and cosmogony. They do not abide by the fact that cosmogony *cannot* properly nor correctly be subsumed under cosmology. Noteworthy is the fact that cosmology is the *science* of the cosmos.

Cosmology

The study of the nature of the structure of the universe; use of tools and technology to describe aspects of the observable and physical universe.

By the very definition of the term, then, cosmology entails characteristic activities of scientists; i.e., astronomers, who study *natural* objects and/or events in space, as an extension of the natural environment on the surface of the earth. For instance, cosmologist-astronomers study the present brightness of stars, detect sequences of changes of stars and planets, and deduce the arrangement of the planets with respect to the sun (even though there is, as yet, no observational means for checking such deductions). In contrast cosmogony involves *ideas* scientists have about the beginning of the universe.

Cosmogony

A list of ideas or formulations centered on origination and generation of the universe.

Astronomers put forth numerous sets of cosmogonical

ideas about the origin of the universe; and, in turn, scientists have certain cosmogonical ideas about the origin or ultimate beginning of the solar system. But cosmogonical ideas about what "might have happened" before the present are always beyond the scope of proper, orderly scientific work.

The very significant difference, then, between cosmology and cosmogony is found in the fact that cosmologist-astronomers study what is *now presently seen*; whereas, the ideas of cosmogonist-astronomers center on presumed or imagined past events that might have occurred *before the present*. Even contentions about light coming from great distances (and hence related to some past events) do not significantly detract from the fact that the light is detected in the "present" of the lifetime of some astronomer.

To delineate further and enlarge upon the stated difference between cosmology and cosmogony, modern science teachers should show students explicitly: (1) how specific aspects of scientific activities in the *present* are utilized by astronomers, *as cosmologists*, and (2) how extensive speculation, imagination, and scenario formulations about the *past* are employed by astronomers, *as cosmogonists*. Brief attention to such actions of cosmologists, and then of cosmogonists, will be given in the following sections.

Methods of Cosmologists

Early on, then, the modern science teacher should illustrate limitations of scientists. Like all scientists, astronomers are restricted to studying aspects of the universe as they find them "present" during their lifetime. In their specialized approach to *natural* aspects of their environment scientists most commonly begin by stating a question, by formulating a problem, such as—for astronomers—what is the size of the universe?

With this question stated, a very valuable point can be made about *boundaries of measurement* within which cosmologist-astronomers must operate. This phase of preparation for clarification about cosmological studies can be accomplished by reference to the accompanying distance-scale pyramid (Figure 1).

Radar pulses and laser beam technique can be used—along with other points about velocity of light, orbits,

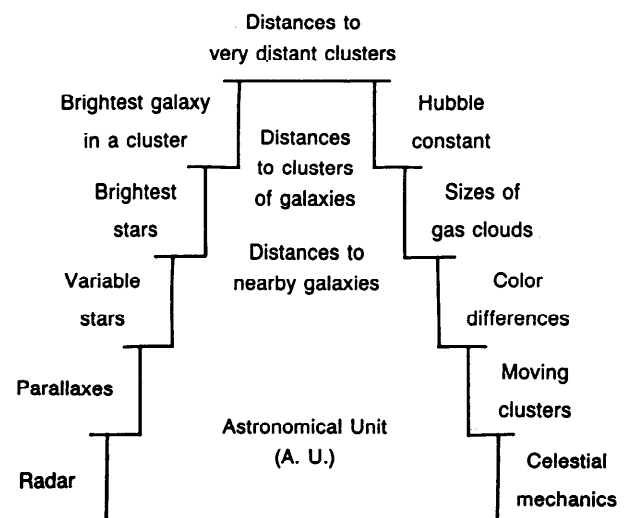


Figure 1. The Distance-Scale Pyramid.

size of planets, and gravitation—as part of celestial mechanics to gain good approximations of comparative distances of Mercury, Venus, Earth and Mars from the Sun.

Then the parallax principle can be used to calculate distances between the earth and a star as seen from different positions of the earth during a given year. By this trigonometric method the distance to some star can be measured to an accuracy of one percent out to a distance of 160 light years. (A light year is the distance light travels in one year at the speed of 186,000 miles per second.)

However, a word of caution is needed here. Modern science teachers should be ever alert to help students become aware of possible semantic confusion in the very words used by scientists as specialists, and even by non-specialists. Too, too often the word “measurement” is used carelessly. When a scientist measures a table top (length, width or thickness), some agreed upon range of probable error is necessarily involved. Dimensions on the earth can be measured, mainly, with very high degrees of accuracy (with very low probable error).

But scientists do not “measure” the size of the universe, and they do not “measure” the age of the universe. Nor do scientists “measure” the age of a rock. In each instance scientists are limited to stating *estimates*. Thus every opportunity should be taken to clarify possible confusion between the words “measurement” and “estimate.” Too, too often the word “measurement” is used by astronomers when the term “estimate” would be more accurate.

Actually the accuracy of distance estimation becomes worse and worse beyond the distance of 160 light years and the parallax principle *cannot* be used for further distances into space. What can be used?

Astronomers, as cosmologists, identify color differences of certain variable stars, size of gas clouds of the brightest stars, and comparisons of brightness in different clusters. Herein is exemplified the dependence of astronomers upon the *comparative method*. Comparative color, comparative brightness and/or intensity are all that astronomers can use. Therefore, *only vague estimates* are possible as astronomers strive to develop an answer to the problem, what is the size of the universe?

It is true that laser beams, radio telescopes, and x-ray detection devices are used in deriving further *estimates* of great distances in the universe. However, particularly important regarding limitations of astronomers, as cosmologists, is the fact that the distance-scale pyramid is mostly an array of vague estimates—involving, particularly, comparative *estimates of brightness*. Accuracy cannot be anything like that attained by radar measurements and parallax calculations.

Methods of Cosmologists

Modern science teachers should be intent upon clarifying subtle nuances of meaning regarding origin questions. Therefore modern science teachers must highlight the differences between cosmological studies accomplished more or less in accordance with proper limiting principles of science (i.e., observational, quantitative, mechanical, and correctable), and the tendency of “free-thinkers” after Galileo to move away from adherence to such limiting principles. This tendency to

move from careful cosmological *study* into cosmogonical *thinking* is fully characteristic of writers since Descartes and Kant to modern astronomers and astrophysicists, who discuss freely and openly their *ideas* on the beginning of the universe.

Thus in teaching about first origins the modern science teacher should very candidly point out that, from the time of Descartes and Kant, modern cosmogonists have “invented” ideas that are *not* fully naturalistic, but substitutionally *unnaturalistic*. Cosmogonists of the nineteenth century to the present repeatedly have utilized unnatural ideas about objects and/or events regarding their imagined origin of the universe.

For instance, Lemaitre imagined a primeval atom that came into existence *ex nihilo*, appearing suddenly out of nothing, that is, from no previously existing matter. Gamow imagined that an infinitely large structure of eternal existence evidently was the source of the universe. But these concepts *do not* involve naturally occurring objects and/or events of any magnitude known to scientists. Careful natural scientists deal with naturally occurring objects and/or events *in the present*. (Imaginative ideas typical of Descartes, Swendenborg, Kant, Buffon, Lemaitre, Gamov, Hoyle, Bondi, and Gold are summarized in Table I.)

Those cosmogonists formulated a variety of cosmogonical schemes in contrast to the primary cosmogonical position of Copernicus, Kepler and Newton, held for centuries and centuries, that God was the Creator of heaven and earth and all therein. Those cosmogonists went far beyond observationally grounded science of the cosmos (cosmology); and, in doing so, they relied heavily upon their imaginations to write *scenarios* about very *unnatural* objects and/or events of origination and generation and the universe as substitutions of the “traditional” cosmogony of Copernicus, Kepler and Newton.

Cosmogonists Are Analogy Dependent

Furthermore cosmogonists are very dependent upon an analogy between sound transmission and light transmission, presumably over great stretches of space from distant stars to the earth. Early in any serious discussion of creation/evolution ideas on the origin of the universe a careful analysis of the astronomers’ analogy between known, *measurable* sound transmission and interpreted, *deduced* light transmission should be made quite evident by the modern science teacher. See Figure 2. This important analogy between sound and light is basic to the concept of “red shift” of light, which in turn is one of the basic “arguments” raised regarding the question, Is the universe expanding?

In brief review, the Doppler effect as it applies to sound is noted when a train whistle, for example, seems higher as the train is approaching a listener and lower as the train passes on in the distance. A simple explanation of this observational phenomenon is that the wavelength of sound heard is affected by the velocity of the object from which the sound is emitted. Thus the approaching train seems to have a higher pitch because the wavelength of the sound is shorter, whereas a departing train seems to have a lower pitch because the wavelength of the sound is longer.

Similarly for light, the wavelength that is measured is also dependent upon the velocity of the object emitting the light. (Of course astronomers still accept Ein-

TABLE I. ON COSMOGONIES

Making plausible guesses as to the origin of the universe is evidently a challenging pastime. Given : (1) a generous supply of matter in a simple "undifferentiated" form, (2) the known laws of nature, and (3) infinite time, the object is to derive the present state of the physical world .

Primeval Atom "Hypothesis" (Lemaitre, 1927)	Big-Bang "Hypothesis" (Gamow, 1947)	Steady-State "Hypothesis" (Hoyle, 1948)
1. Superatom of radius equal to earth's orbit. 2. Explosive radioactive disintegration followed by: 1. rapid expansion. 2. deceleration by gravitation. 3. renewed expansion evidenced by red shift of distant galaxies. 3. During first and second stages, aggregations formed into planets and stars. 4. Cosmic rays are really "fossil rays" of expansion. 5. Primeval atom came into being <i>ex nihilo</i>; that is, appearing suddenly from no previously existing matter.	1. More sophisticated than one by Belgian Jesuit Lemaitre. 2. Began with infinitely large structure that expanded to present state. (How did explosion propagate over infinite distance?) 3. Primordial matter called "ylem" (i-lem) of 10^{14} g/cm³ density. 4. First contraction phase yielded pre-ylem stage of density, then violent elastic rebound of catastrophic episode. 5. Known atoms were synthesized from atoms in less than an hour in intense heat of explosion. 6. Evidently expansion will continue indefinitely.	1. That is, continuous creation. 2. Infinitely old, infinitely large universe is constantly expanding. 3. New matter appears to replenish lost matter in space. 4. Self-creating matter is hydrogen which condenses into galaxies within which evolve stars, planets, satellites, comets, plants, animals and people. (Mankind is condensation out of nothingness.) 5. Hoyle said question about source of new matter is "meaningless and unprofitable" (or Hoyle does not know). 6. After 17 years Hoyle abandoned his idea. (See <i>Nature</i>, 208:113, Oct. 9, 1965.)

stein's idea that the velocity of light is absolute, and is not affected by the velocity of the source of light.) By means of a prism that separates light into a complete spectrum of wavelength, it is possible to analyze the light emitted by stars, galaxies and nebulae. From such data astronomers have calculated the velocity of stars, which seem to move only a few miles per second. However, many galaxies seem to be moving at very high velocities as detected through analysis of those light sources.

Characteristic of Doppler shifts of light of many galaxies is a shift in the spectrum lines that move systematically further and further toward the red end of the spectrum of light. This is called the "red shift."

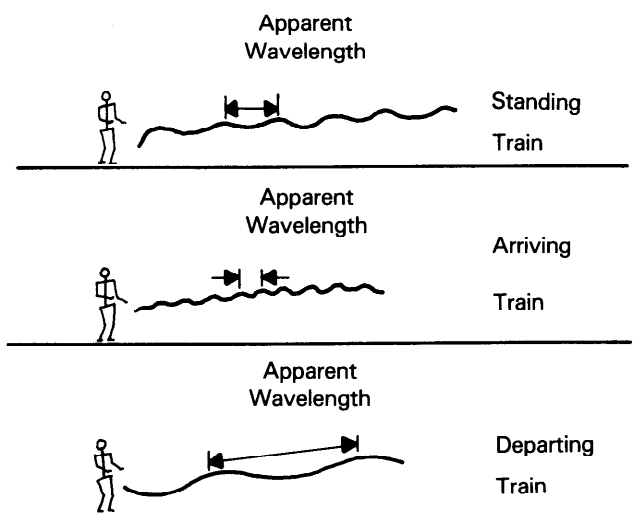


Figure 2. Representation of the Doppler Effect.

Since red has a long wavelength in contrast to blue, which has a short wavelength, astronomers *interpret*, analogously to sound transmission interpretations, that distant galaxies are moving away from the observer and the earth.

But the red shift is difficult to detect. There is significant controversy between astronomers, such as Arp and Bacall, regarding various anomalies in red shifts. Results are not consistent for light from certain stellar objects considered to be at the same distance or any varying distances from the earth.

A careful study of the Doppler effect with regard to sound is most instructive in building understanding of the Doppler shift in light upon which astronomers base so much of their thinking about the "big bang," expanding universe cosmogony. It is paramountly important that the modern science teacher make very explicit that this analogical reasoning is vital to—is at the heart of—modern cosmogonical thinking. Remove this analogy between sound transmission and light transmission from their thinking and modern cosmogonists would be without a most significant *circumstantial* support for their expanding universe idea. (See Table II on types of evidence.)

Cosmogonies Are "Historical" Theories

Cosmogonists, then, are dealing with "Historical" Theories. Yet not history involving human beings, but rather "historical" in the sense of *past*, imagined, conjectured, speculated events presumed to have been antecedent to the present universe. But "Historical" Theories are different than proper, orderly scientific theories (like the Atomic Theory or the Gene Theory) that involve testing of ideas about *natural* phenomena in the "present" lifetime of scientific inquiries. The tests that cosmogonist-astronomers employ, however,

TABLE II. TWO SETS OF EVIDENCE
Circumstantial Evidence for Big Bang Origin
of the Universe

1. Red shift of light spectra.
2. Occurrence of nova and supernovae.
3. Detection of background radiation and radio noise.

Circumstantial Evidence for Creator Origin
of the Universe

1. Angular momentum in solar system, of universe.
2. Orderly patterns (designs) of constellations.
3. Orderly patterns (designs) of planetary motions, of comet motions.

are tests of the internal consistency and reasonableness of their ideas about *unnatural*, imagined phenomena in the past.

Is it reasonable that the present *order* of planetary orbits, star constellations, cycles of elements and cycles

of seasons came out of chaos, which would logically follow explosion of some presumed dense substance? Students can readily understand that patterns of buildings, automobiles, and even playground equipment are manifestations of intelligent designs of architects and engineers. Clearly the modern science teacher will be fully responsible to point out that the order, pattern and regularity of the present universe are consistent with the Design Argument for the existence of the Creator, the Ultimate Cause of all things in the heaven and on the earth.

Furthermore, "Historical" Theories are most properly labelled *models* of origin, and then an even clearer separation from proper, orderly scientific theories is possible. (See accompanying main points of Evolution Model and Creation Model with regard to the universe in Table III—each formulated to bring out the greatest contrasts in two positions.)

TABLE III. ON THE ORIGIN OF THE UNIVERSE

Because the primeval origins are completely beyond the limitations of scientific method, which is based upon initial observations, experimentation and repeatability, no one will ever be able to say, within present technology, a. "Scientists have proved that all things have evolved from a primeval common origin," or b. "Scientists have now proved the special creation of all things in the beginning." Therefore the question as to which *model* of origins is ultimately the better model of origins can never be fully resolved scientifically, and one of the two models of ultimate origins is accepted by an individual, eventually, *as a belief*, not by any scientific proof or historic proof.

In the chart below, certain features of origins are related to the two main possible models of origins; each formulated to bring out the greatest contrasts in the two positions.

Evolution Model (Evolution Cosmogony)	Creation Model (Creation Cosmogony)
(a) Origin of the universe:	
Eternal existence of some form of matter (no cause).	Universe created essentially in present form (cause: Eternal Creator).
1. Big-bang concept: explosively expanding from primeval state of extremely high density.	1. Light sources established.
2. Steady state concept: continual appearance of matter with simultaneous decay of matter, resulting in constancy.	2. Light rays, with electromagnetic fields, created directly and light sources seen instantly.
(Above violate law of conservation of matter and second law of thermodynamics and cause and effect assumption.)	3. Whole universe created full grown and functioning perfectly with unique fitness of earth for life quite evident.
	(No observed facts of scientists can be used to contradict above ideas.)
(b) Origin of elements:	
Nucleogenesis of subnuclear and subatomic particles involving hydrogen initially leading to ascending series of elements. (No mention of initiating energy source.)	Creator was source of cosmic nucleosynthesis which He empowered.
(c) Origin of stars, galaxies:	
Stellar and galactic evolution in some kind of evolutionary series based on assumption of what "must have happened": "young" to "old."	Essentially stable, completed (finished) creation with concurrent principle of disintegration consistent with all astronomic measurements since man began to make such observations.
(d) Origin of solar system:	
Nebular, tidal, dust cloud, collision, and close encounter concepts have been proposed but no evolutionary theory can be used to explain these peculiarities: anomalous distribution of moons, differing chemical compositions, geometrical placement, and the unique atmosphere and hydrosphere of the earth.	Primeval perfect, complete, functioning earth, moon, and planets created simultaneously; followed by imposed principle of disintegration with great catastrophes (asteroids, comets, bombardments of moon and Mars, etc.)
—Processes of cosmos supposedly processes of origination and integration.	—Processes of cosmos observed to be processes of conservation and degeneration or decay.

Now the majority of scientists resist making a separation, or distinction, between models or ideas of origin and proper, orderly scientific theories. No doubt resistance to such a delineation centers in the conscious or unconscious realization by cosmogonists that they do not want their scientific specialist colleagues, or non-specialist citizens, to appreciate the difference. Cosmogonists no doubt would like their ideas on origination and generation of the universe to *appear* as scientific as the broad conceptualizations of the Kinetic-Molecular Theory or the Atomic Theory.

And of some significance regarding public reporting of cosmogonical ideas is the fact that cosmogonists write their ideas of origination and generation of the universe or parts thereof in terms of *scenarios*! Evidently, to make cosmogonical ideas attractive to persons of all degrees of scientific training, authors of such ideas draw up "scenarios" (a type of play) of moon origin, say, or origin of Mars. Such scenarios appear even in the most prestigious scientific journals!! So it is very important that students understand that cosmogonists are authors of play-like scenarios, which are significantly different than proper, orderly scientific theories regarding the nature and structure of matter that are generated by physicists and chemists.

Evidence and "The Beginning"

Is cosmogony only speculation, imagination and conjecture? No! Cosmogonists "build" upon certain empirical findings accumulated by cosmologists, *after the fact* of the beginning of the universe, which can be employed to support circumstantially the "big bang," expanding universe cosmogony.

Cosmogonists *do* utilize certain conditions of the present as a basis for extrapolations backward into time. But cosmogonists are limited to beginning with *circumstances of the present*, and they are totally unable to test scientifically, through any repeatable observations, how these circumstances actually came into existence. No one knows the initial conditions of the universe.

The modern science teacher should help students realize that cosmogonists do have some *circumstantial* evidence in support of their commonly adopted ideas. But the evidence is *only* circumstantial.

And each one of the points of circumstantial evidence may be used to support the contention that some

beginning of the universe is required. Students can grasp that nontheistic cosmogonists "begin" the universe with the "big bang" concept, which is so popular today. Conversely, theistic cosmogonists, as did many "founders" of modern physical science, maintain that "In the beginning" the universe was created essentially in the present form.

No evident cause is given by nontheistic cosmogonists. Apparently proponents of evolutionary cosmogonies consider that some inherent propensity for organization into a dense particle preliminary to explosion was characteristic of Eternal Matter. A logical question is, What caused the formation of that dense substance? But just at this point nontheistic cosmogonists ignore the "cause and effect" assumption so basic to all scientific thought. Apparently nontheistic cosmogonists ignore excellent circumstantial evidence given in Table II in support of the Creator origin of the universe.

The theistic cosmogonist accepts Eternal God, Who has existed outside of time and space, as the Ultimate Cause of the heaven and the earth, and all that is therein. Thus the theistic cosmogonist goes one step beyond the nontheistic cosmogonist as far as cause and effect is concerned. Yet even the theistic cosmogonist must have a "given": the Creator, the Eternal One—the original cause of it all. And belief in the Eternal, Personal Creator was commonly characteristic of those early scientists (i.e., Copernicus, Brahe, Kepler, Newton) who began the discipline of modern science. Modern theistic cosmogonists are standing with those early scientists in contrast to the majority of nontheistic evolutionary cosmogonists.

Logically the modern science teacher will want to explicate further aspects of cosmogonical *thinking* that need careful attention. Therefore the science teacher should raise such questions as: What is the universe expanding from? Where is the center of the universe? What caused the proposed expansion after the supposed "big bang" explosion? These questions, of course, cannot be answered scientifically within the present technology. However discussion of such interrogations will help students comprehend more fully the distinction possible between *scientific* questions, and what are essentially metaphysical questions about first origins, which are fundamentally outside the purview of proper, orderly scientific work.

PANORAMA OF SCIENCE

Meteor Crater Has Its Youth Restored (to some Extent)

On the cover of *Nature* for 19 April 1984, was a picture of Meteor Crater, Arizona; and the caption stated that the crater was about 50 million years old. Shortly thereafter, a letter took issue with this estimate, and maintained, on the basis of thermoluminescence, that the crater is about 50 thousand years old.¹

Here is a reduction by a factor of one thousand. But many Creationists will believe that the proposed 50 thousand years is still much inflated. The letter mentions "... two major pluvial episodes of Pleistocene age ..." as indicated by patterns of erosion. Might these not indicate something which happened during

the Flood, the crater itself having been formed before or during the Flood?

The thermoluminescence, on which the estimate of age was formed, is supposed to have accumulated slowly after the crater was made, from natural radioactivity. Is it not possible, however, that the meteorite (if such it was) brought in extra radioactivity, which speeded up the accumulation of thermoluminescence, but which has by now disappeared?

Here is another matter which may be worth some investigation by Creationists.

Reference

1. Sutton, Stephen R. 1984. Crater dated. *Nature*, 309:203.
Suggested by William I. Thompson III

Another Mechanistic Explanation (as well as the Chicken) Lays an Egg

A recent article in *Nature*, reporting investigations performed nearly forty years ago, may be of some interest.¹ The object was to find out what happens when a hen lays an egg; and the study was carried out with X-rays.

The curious thing found was this: while the egg is being formed, the sharp end points toward the cloaca. Shortly before the egg is laid, however, it is rotated so as to have the blunt end toward the cloaca, and the egg is laid blunt-end-first.

The question naturally arises: why this roundabout way of doing things? One suggestion, proposed before these facts were known, was that the muscular contractions propelling the egg down the oviduct give it its shape. This is clearly not the case.

Another suggestion was that the blunt-end-first attitude is best to protect the egg, and the internal organs of the hen, against damage from the rather forceful muscular contractions. But the X-rays showed that, in fact, the supposed contractions are of minor importance.

But why is the egg not formed in the right attitude for being laid in the first place? And why the ovoid form? Some birds' eggs are spherical, or nearly so; and such birds seem to be as successful as any others.

It is not likely that either natural selection, or any other mechanistic explanation, can account for this state of affairs. What is a Creationist to say about it? More studies of this matter by Creationists would be worth while; and they might show us other curious and interesting facts. But meanwhile, may we not say that in this case, and in many others, God has given us yet another example of His power and resourcefulness, in the creation of such an intricate system?

Reference

1. Darius, Jon. 1984. *Nature*, 308:691.

Suggested by William I. Thompson III

Sir Isaac Newton Not a Mechanist?

Recently an interesting book review¹ appeared in *The Washington Times* from which I will quote extensively.

This life of the great physicist and mathematician is a work of true scholarship in several disciplines: the history of science, British history, humane letters, theology, even alchemy. Also, it is written with charm and skill; and with wisdom.

Gale E. Christianson dispels the illusion that Sir Isaac was a man of the Enlightenment; he was something much more intelligent than that. It is Sir Isaac's perception of a transcendent reality (a unitarian reality, incidentally) that gives this book its title. For although Sir Isaac's theories undoubtedly led most later scientists into the cul-de-sac of mechanism and materialism, Sir Isaac himself delved into mystery in his search for the Creator.

The late Arthur Koestler, say, rather than Harlow Shapley, was the true intellectual descendant of Sir Isaac.

"Isaac Newton held tight the conviction that science (or natural philosophy, as it was known in his day) must be employed to demonstrate the continuing presence of the Creator in the world of nature," Professor Christianson writes. "Indeed he believed that the earth is gradually running down. Unless God chooses to restore its motion at some point in the foreseeable future, its fate, and that of every living thing, is sealed."

Voltaire misrepresented Sir Isaac's significance; so did Sir David Brewster, Sir Isaac's first serious biographer". . .

The book being reviewed is *In the Presence of the Creator: Isaac Newton and His Times* by Gale E. Christianson, published by Free Press. Two themes are suggested in the review:

1. Newton was not a mechanist.
2. Newton felt that the physical world was degenerating.

May I suggest that a thorough study of the life and work of Sir Isaac Newton would be a worthwhile project for an interested, capable Creationist. As a matter of fact, the history of science offers many possibilities for in-depth study. This entire field needs to be totally reinterpreted from a Creationist viewpoint.

Reference

1. Kirk, Russell. 1984. The full complex Newton: book review. *The Washington Times*, Washington, D.C. August 8, p. 2C.

Contributed by Emmett L. Williams

Natural Selection Questioned Again

At a meeting of the A.A.A.S., in the spring of 1984, there would appear, from reports, to have been some measure of agreement that Darwinian natural selection may not apply.¹ Gould, discussing some ideas put forward by Dover, stated that genetic changes may be just random, without any reference to fitness or to the creatures' needs. Moreover, the changes can take place in a relatively short time; the appeal is again to punctuated equilibrium.

There are, however, at least two serious objections. In the first place, seldom can anyone point to a mutation which is definitely known to be a chance mutation, and which is clearly beneficial. In the second place, rarely would a change in one feature alone be successful. The giraffes, for instance, which were mentioned as an example, have not only a long neck, but also some special features in the circulatory system, to deal with the great height to which blood must be pumped. Can anyone seriously believe that mutations, causing these two things, came about by chance at the same time?

Reference

1. *The Kingston Whig-Standard*. May 26, 1984, p. 1.

Contributed by H. L. Armstrong

A Seed-Eating Beetle's Adaptation to Poisonous Seeds

The complexity argument favoring creationism becomes increasingly keen as it applies to Gerald Rosenthal's interesting report on the ways seed-eating beetles cope with poisonous seeds. Rosenthal writes that:

Most insects depend on plants for their food and so are among the most aggressive and destructive adversaries of plants. Terrestrial plants characteristically lack mobility and cannot elude these destructive pests by flight. Yet plants are far more than passive participants in the struggle that has gone on between insects and modern plants for more than 50 million years.¹

Dealing first with Rosenthal's remark about 50 million years, even evolutionary botanists like Willis Jepson² would hold that major floral developments in California took place in the last million years or so since the Pleistocene. But our interest centers instead on the vinelike legume *Dioclea megacarpa* and its only predator *Caryedes brasiliensis*, a small beetle of the family Bruchidae, which includes seed-eating beetles of world-wide distribution. Rosenthal reports one reason this plant is so successful in repelling other insects is that it stores L-canavanine, an insecticidal amino acid which disrupts the production of normal insect proteins. Can these adaptations be attributed to evolutionary processes?

Canavanine functions as an important nitrogen-storing metabolite, particularly in the seed where it supports the newly developing plant. L-canavanine is structurally similar to L-arginine which is one of the 20 amino acids incorporated into proteins. In L-canavanine the terminal CH_2 group of arginine is replaced by oxygen. This substitution is harmless and L-canavanine serves in virtually every reaction for which arginine is the preferred substrate.

But canavanine is chemically much less basic than arginine and under physiological conditions would be less positively charged than arginine. This difference can affect the interactions that cause the protein chain to fold up into the uniquely correct conformation of a given protein molecule. There is increasing evidence that proteins structurally altered by the incorporation of canavanine instead of arginine do not function properly. Herein lies an important toxic effect of canavanine on most insects.

When the seed-eating beetle *C. brasiliensis* feeds on seeds of *D. megacarpa* having a large amount of canavanine in them, they develop normally! As many as 50 beetles are known to develop in a single seed which is only about one inch in diameter and 0.25 inches thick. Yet Rosenthal found that canavanine can account for as much as 13 percent of the seed's dry weight and 55 percent of all the nitrogen of the seed. How then can this insect thrive on what is so poisonous to others, such as the hornworm? The answer is that this beetle has four highly integrated biochemical adaptations which enable it to cope with the otherwise poisonous canavanine.

Rosenthal and associates first wondered if this bruchid beetle actually incorporated canavanine into its protein or not. On the basis of some radiochemical ex-

periments, they concluded that the larvae were not incorporating canavanine into protein in significant amounts, though very small amounts were present. They also found that the enzyme which activates arginine for incorporation into proteins within the moth would react with arginine and canavanine but that the same enzyme in this beetle used only arginine! So the beetles are endowed with enzymes that discriminate between arginine and canavanine. Thus the beetle avoids production of aberrant proteins by never activating the canavanine.

Just how do the beetles handle this canavanine which is very abundant in the seeds they eat? Through various measurements and calculations it was determined that only about one-half of the canavanine of the seed actually gets into the larvae as the rest is expelled in the droppings or "frass." Still we wonder how the ingested canavanine is metabolized. Canavanine is split by the action of the arginase enzyme into L-canaline and urea.

The second important adaptation surfaces here in that although urease is seldom found in insects, bruchid beetle larvae have an extraordinarily high urease activity. Thus the larvae cleave canavanine into canaline and urea after which urease enzymes catalyze the change of urea into ammonia.

From further studies involving heavy-nitrogen labeling, the authors found that these larvae actually were able to use the ammonia produced from urea to synthesize several of their essential amino acids.

One further problem remained, since canaline is highly toxic in its own right, retarding growth and causing severe developmental aberrations in the horn worm. It would seem that the beetle is merely exchanging one poison for another! The third adaptation involves an enzyme that is capable of converting canaline to homoserine and ammonia in the larva.

But how do the larvae deal with all the ammonia which is a toxic form of reduced nitrogen? Analysis of the frass showed that nearly 90 percent of the nitrogen in it was in the form of ammonia and urea and only 11 percent was uric acid, the usual excretory product of insects. But elimination by way of the frass is not the only way that the larvae avoid the toxic effect of too much ammonia. The fourth adaptation is a highly active glutamic synthetase which can add ammonia to glutamic acid to form glutamine. This final adaptation is important since glutamine is the main amino acid used in the insect's hemolymph. Proline also is very high. The reaction sequence from proline to glutamic acid to glutamine may provide an important means of channeling toxic ammonia into a harmless form.

Accordingly we have here a remarkably complex adaptation consisting of at least four steps: (1) the selective elimination of about 50 percent of the poisonous canavanine in the insects in the frass, (2) conversion of L-canavanine into canaline and urea, (3) conversion of L-canaline into the useful homoserine and ammonia, and (4) the very active glutamic synthetase capable of adding ammonia to glutamic acid to form glutamine.

Just how does Rosenthal attempt to explain the origin of the above complex of interrelated reactions from the viewpoint of evolution? As the first step he postu-

lates that the bruchid beetle that originally invaded the legume may have simply excreted the canavanine and canaline or somehow avoided them. The other nitrogen-rich metabolites stored in the seed, such as the proteins, could have satisfied the need of the growing larva for nitrogen. So far so good, although Rosenthal presents no data to show how this avoidance or excretion system might have arisen. He goes on instead to postulate that over a period of time, through natural selection, the insect may have become progressively better equipped to cope with canavanine and canaline and ultimately could utilize the nitrogen they contain. He makes no attempt to state just what mutations would be needed to achieve this remarkable adaptation or the order in which they might have occurred.

Now it should be stated that the reaction equation which produces canaline and urea from canavanine is not one which occurs spontaneously. Though thermodynamically possible, it would proceed far too slowly, if at all, were it not for the enzyme arginase. The very use of the word "cleave" indicates that this is an endothermal reaction or one which requires energy to proceed. The insect of course gets this energy from respiration which is a highly exothermal reaction.

One need not be a skilled biochemist to realize if appropriate enzymes for a particular biochemical reaction are present, they will lower the "activation energy" (the energy required to start the reaction). Thus James Bonner has reported³ that the activation energy for the uncatalyzed reaction between ethyl butyrate and hydrogen (without an enzyme present) is 13,200 calories per mole but under the influence of lipase enzyme, the activation energy is reduced to only 4,200 calories per mole.

A change in activation from 20,000 cal/mole to 10,000 cal/mole, for example will increase the RATE of reaction about 500,000 times. Thus the presence of an enzyme generally increases the *rate* of the reaction it catalyzes tremendously.

What Rosenthal is proposing, therefore, is the simultaneous origin of several highly complex enzymes required to "process" canavanine in the body of this beetle which feeds upon *D. megacarpa*. He is assuming that in a relatively short period of time the following enzymes arose (by mutation): an enzyme to cleave the canavanine, one to reduce the canaline, and others capable of synthesizing glutamine from the "left-over" ammonia. To the best of my knowledge, "creative mutations" have never been reported for this series of enzymes. And, one must remember that all of the complex organic chemical reactions must work together to be effective. Though Rosenthal has done a superb job in outlining the various steps by which the bruchid beetle is adapted to using an otherwise highly poisonous compound, he simply makes no real attempt to discuss the series of mutations which could cause this.

It would seem to me on the other hand, that this adaptation of the beetle is a classic example of God's remarkable interest in preserving even the least of His creatures. Another feature demonstrating divine design is that although the larvae of these beetles destroy some of the seeds of this wisteria-like vine, most remain uninjured! Since the vine can propagate itself

by sprouting, these remarkable seed adaptations are apparently not absolutely essential for its survival. And finally, the adult beetles feed on the pollen of the flowers of various plants thus helping to pollinate them, since any disturbance of the pollen helps to spread it to the stigmatic surfaces of the pistils of the flowers and promote seed set. Taken together, all of these adaptations support an origin by divine design rather than an evolution sequence.

If careful study were made, perhaps many other instances of insects adapted to the digestion of otherwise poisonous substances in the seeds or other parts of plants could be found. This would be a most interesting field of research for entomologically-minded creationists. Answers could be sought to the following questions: Does the genus *Caryedes* of the bruchid beetle family have any other species in it? If so are they also able to live on a diet of canavanine or related amino acids? Perhaps this type of adaptation is more widespread than one would tend to believe by simply reading Rosenthal's article.

References

1. Rosenthal, G. A. 1983. A seed-eating beetle's adaptation to a poisonous seed. *Scientific American*, 249(5):164-171.
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3. Bonner, J. and J. E. Varner. 1965. Plant biochemistry. Academic Press, New York, p. 8.

Contributed by Walter E. Lammerts

To Incubate an Egg

All crocodilian species including our own American alligator, *Alligator mississippiensis*, construct nests for the incubation of their eggs. The temperature required for all species studied is above 27°C (80°F). Not only is the proper temperature required for embryonic development, but also it is the incubation temperature and not sex chromosomes that determine whether the hatchling will be male or female. Mean incubation temperature above 30°C (85°F) produces predominantly females while lower temperatures produce males. Crocodilian nests often are located in open, moist areas and are heated by the sun and rotting vegetation. In many cases, females actively guard the nest against predators and carefully dig out hatchlings. In some instances, the young actually are carried to the water by the mother.

Consider a different example of crocodilian egg incubation. Schneider's smooth-fronted Caiman, *Paleosuchus trigonatus*, may be the most abundant of all crocodilians. It inhabits extensive tropical rain forests of South America. Mean forest floor temperature (and Caiman body temperature) is 26°C (77°F). Sunlight is not available on the forest floor. Only leaf litter nests (even with a clutch of crocodilian eggs) do not generate sufficient heat to incubate the eggs. For years, naturalists have been baffled by the problem of how crocodilian eggs can be maintained at the proper temperature deep in a tropical rain forest.

William Magnusson of Instituto Nacional de Pesquisas da Amazonia, Brazil recently solved this interesting problem. In a paper at a recent international herpetology meeting¹ he showed data indicating that the

Caiman lays its eggs inside the edge of a termite mound and covers the eggs and termite mound with leaf litter. Termites repair the damage and extend their nest to include the crocodilian eggs. Termites then regulate the termite mound temperature resulting in incubation of the crocodilian eggs at an ideal temperature of 30°C (range 28.4-32.1°C). The mother stays nearby and guards the nest and presumably releases the imprisoned young upon hatching. Now it is argued that it is low temperature for egg incubation that has limited other crocodilian species from reproducing in tropical rain forests. The only other crocodilians that inhabit tropical rain forests nest on sunny river banks traversing the forests.

Incubation of crocodilian eggs inside termite mounds should be of special interest to creationists. It appears to be excellent evidence of design in nature. The odds against a gravid female tearing into a termite mound, depositing her clutch of eggs in the proper place inside the mound and covering the eggs and termite mound with just the optimum amount of leaf litter are astronomical. If she tears up too much of the termite nest and places the eggs near the center, either termites may abandon the nest or if the mound is repaired the eggs will be at 35°C (95°F) and they will die. She cannot use surface thermal cues because the termite mound surface temperature is no different than the surrounding air temperature until she adds leaf litter. If this whole process evolved, it could not have happened gradually over a period of time but all together, otherwise it would not be adaptive and would be discontinued. Finally it must have happened innumerable times before the process became instinctive and genetically could be passed on to the progeny. It requires less faith to accept as fact both design and Designer. "The fool hath said in his heart there is no God." (Ps. 14:1.)

Reference

1. Magnusson, W. E. and A. P. Lima. 1984. Sources of heat for nests of *Paleosuchus trigonatus*. Combined meeting of the American Society of Ichthyologists and Herpetologists, Herpetologist's League and Society for the Study of Amphibians, University of Oklahoma, Norman, Oklahoma, Abstract, p. 150.

Contributed by E. Norbert Smith

To See or Not To See

Contrary to the view held by many evolutionists, many aspects of the creation/evolution conflict are testable and thus verifiable by conventional scientific methods. One such testable area is that of vestigial organs. If evolution accounts for the present form and function of animals, one would predict various organs to become useless as an organism changes. Indeed, evolutionists have claimed many so-called vestigial organs and have gone full cycle and said the presence of various vestigial structures is evidence of evolution. If, instead, the form and function of extant organisms was the product of design, then we would hardly expect the Designer to have produced organisms with useless structures. Point in case; meet the Caecilians.¹

Caecilians are a group of pan-tropical legless amphibians. Most are burrowers and all have a specialized tentacle sense organ. They have a heavily ossified

skull and elongated body. They are tailless and have varied reproduction. Some lay eggs, others maintain the eggs until they hatch and the larvae graze on specialized epithelium cells within the oviducts. Complete metamorphosis occurs prior to birth. Caecilians have been reported by many authors as having vestigial eyes or lacking eyes. Recent histological studies by Dr. Marvalee Wake at the University of California at Berkeley have shown the data regarding caecilian eyes is supportive of the creation model with its prediction of no vestigial organs. She has carefully examined 18 species of 14 genera representing four of the five families of Caecilians. The entire geographic range of the order was sampled including embryos, fetuses, larvae, aquatic adults as well as terrestrial adults were studied. In some cases, extrinsic muscles were present in the eye. Others had no extrinsic eye muscles. None of the species had components for accommodation. In many species, tear glands functioned for the sensory tentacle instead of the eye. Most had a lens but it varied from clear to cellular to amorphous. Some totally lacked a lens. Some eyes were located at the surface, some under skin and some below bone. Eye development was not correlated with taxonomic position. Aquatic species appeared to have better developed eyes than terrestrial forms. All species examined had "typical vertebrate" layered retinas and all had intact optic nerves.

It would appear from this study that while the eyes of Caecilians are small and in many species are not capable of forming images, they all function at least as light sensors. This is precisely what the creation model predicts and forces the evolutionists to look elsewhere for the elusive vestigial organ. "The hearing ear and the seeing eye, the LORD has made both of them." (Prov. 20:12.)

Reference

1. Wake, M. H. 1984. Comparative morphology of the eyes of Caecilians. Joint meeting of American Society of Ichthyologists and Herpetologists, Herpetologist's League and Society for the Study of Amphibians and Reptiles. Oklahoma University, Norman, Oklahoma 73069. Abstract, p. 211.

Contributed by E. Norbert Smith

Florida Fossils Puzzle The Experts

Recent excavation of a fossil bed near Florida's west coast, south of Tampa, has yielded the bones of more than 70 species of animals, birds, and aquatic creatures. Said by paleontologists to be one of the richest fossil deposits ever discovered in the U.S., the remains were found in a relatively thin layer 2 to 12 inches in thickness. Above and below the fossil bed were layers of shell and sand several feet thick.

About 80 percent of the fossil bones were those of plains animals: camels, horses, mammoths, mastodons, mylodon sloths, giant tapirs, and wild pigs. There were also bones of bears, giant beavers, timber wolves, and large cats including sabre-tooth tigers. Bones of 16 species of birds were identified, 14 of them waterfowl; one bird had an estimated 30-foot wingspan. Mixed with all these were the remains of sea creatures including sharks' teeth and giant sea turtle shells, as well as bones of both freshwater and saltwater fish.

The bones were jumbled together as if by violent forces, the mammoth tusks broken and slivers scattered over a wide area. One tusk had been sharply bent, obviously while still green and attached to the mammoth. The area surrounding the fossil deposit is believed by some to have been an ancient riverbed. Yet indications are that it has been primarily an estuary environment, since shells and sand surround the fossil layer and ancient mangrove stumps were found. The local terrain is extremely flat, with no evidence of swiftly-flowing rivers that might have helped to explain this remarkable deposit. Those who try to devise a uniformitarian scenario must face the problem: how could the remains of all these plains animals, thoroughly mixed with those of waterfowl and sea creatures, possibly end up in this place?

Paleontologists have dated the fossil bed at 1.5 to 2 million years old, on the basis that the types of animals found are believed to have lived during the Pleistocene epoch. The local newspaper has produced a

colorful poster describing the fossil find. It is captioned "Tampa: Two Million Years B.C." and is advertised for sale to school children. The premise of news articles about the dig is that the animals lived and died in the same general area where the remains are found, possibly during a glacial period when the sea receded.

The fossils are to be placed in the Florida State Museum at Gainesville for study. Local creationists are seeking ways to gain a hearing for evidence that the earth is not so old, and that Flood geology provides an explanation for the fossil deposit.

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2. Klein, Gil. 1984. Excavation of shell pit resumes. *The Tampa Tribune*, April 6, section B.
3. Loft, Kurt. 1984. Tampa: Two Million Years B.C. *The Tampa Tribune*, July 29, section I.

Contributed by Carol Armstrong

IN MEMORIAM

JOHN J. GREBE: 1900 - 1984

In the spring of 1984, John J. Grebe, a creationist scientist who was well-known and highly regarded by scientists and engineers, passed away. He had retired to Sun City, AZ some 18 years ago. Dr. Grebe was known and respected as a creationist leader, having been one of the original "team of ten" who founded the Creation Research Society (CRS). He also served on the Board of Directors.

In 1924, shortly after joining Dow Chemical Company in Midland, MI, he organized and directed their Physical Research Laboratories for many decades. Later he served as Director of Nuclear and Basic Research at Dow until the time of his retirement. As a result of his researches, Dr. Grebe holds many patents in the chemical industry as well as in well drilling techniques.

John J. Grebe was born in Uerzig (Rhineland), Germany in 1900. He came to the United States as a boy of 14, living with his uncle, Henry Grebe, in Cleveland, Ohio. After graduating from East Technical High School, he attended Case Institute of Technology in Cleveland, where in 1924, he earned the B.S. degree. In 1928, he earned his M.S. degree in physics. In 1935 Case awarded him the D.Sc. degree. In 1943 he was the youngest man ever to receive the Chemistry Industry Medal for his outstanding contributions. His notable accomplishments at this time were the development of methods for the extraction of bromine from sea water and his work on synthetic rubber. He also served as a consultant to the office of the Rubber Director during World War II. In 1946 he received the Hyatt Award for plastics development. In 1946-47 he joined the Oak Ridge National Laboratory's reactor school on applications of nuclear energy to industry. In 1948-49 he served as chief scientist to the Army Chemical Corps at Edgewood Arsenal. Here he continued to serve his country on a consulting basis until the time of his retirement. He retired from Dow

Chemical Company in 1965, and moved to Sun City, where he became involved in ecological projects.

Certainly Dr. Grebe's career ought to give pause to those raucous voices in our day that proclaim that a creationist never has been and could not become a scientist. Dr. Grebe certainly demonstrated the fallacy of that statement by the whole of his career. In retrospect one would say that Dr. Grebe certainly led a balanced life, serving as he did as a very active member of St. John Lutheran Church in Midland, MI. He was also active in Lutheran camp activities at Camp Arcadia, Arcadia, MI. As a man of God, Dr. Grebe was greatly concerned all his life with the treatment of the environment. In many conversations with him, the writer would find him steadfastly holding to the point that "having dominion over the earth meant conservation, not exploitation." Dr. Grebe protested frequently against the terrible waste of man's heritage on earth, and predicted consequent dire results for the future. Some years ago, his friend and fellow CRS board member Dr. Karl Linsenmann, M.D., wrote of him in the following words:

His prophecies in the world of science have become realities. Yet Dr. John Joseph Grebe remains a humble man of God, unaffected and unaffected — searching and striving that he might leave this world a better place for those who are to follow.

Speaking for himself, the writer vividly recalls the inspiring automobile journey from Wilmore, Kentucky, with Drs. Grebe, Lammerts and Klotz, as we fired ideas back and forth regarding the possible formation of a Creation Research Society. It was on that trip that most of the structure of the Society was first sketched out. The writer is therefore sure that those of us on the Board of Directors who personally knew Dr. Grebe, will feel it a privilege to have known him, and surely will miss his wise counsel and sparkling ideas.

Wilbert H. Rusch, Sr.

SPECIAL FEATURE

RECORDED INSTANCES OF WRONG-ORDER FORMATIONS OR PRESUMED OVERTHRUSTS IN THE UNITED STATES: A BIBLIOGRAPHY — PART III

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BOOK REVIEWS

Physics of the Future, by Thomas G. Barnes. 1983. Institute for Creation Research: El Cajon, California. 208 pages. \$12.95.

Reviewed by Richard R. Pemper*

In this book Thomas G. Barnes attempts to explain the atom, the atomic nucleus, the world of elementary particles, and the forces by which all of these entities interact using what might be called the principle of universality for the laws of physics. The principle of universality states that the fundamental physical laws which apply in one's ordinary experience can also be applied to explain the phenomena in the microscopic levels of the universe, i.e., the laws operating inside the atom are the same as those operating outside the atom. Specifically, Dr. Barnes applies both Newton's laws of motion and Maxwell's theory of electrodynamics to the world of atoms and elementary particles. In this way he is able to theorize the nuclear and gravitational forces to be of an electromagnetic origin. Application of the principle of universality has proven fruitful for physicists of the past. The results of the kinetic theory of gases, for example, were derived by assuming that Newton's laws of motion could be applied to collisions between atoms. In a similar fashion Ernest Rutherford was able to hypothesize the existence of the atomic nucleus.

The approach used by Barnes in *Physics of the Future* is in contrast to the theory of quantum mechanics which assumes the interactions in the microscopic world to be governed by a set of laws different from those of classical, Newtonian physics. The laws of quantum mechanics, while consistent with those of classical physics in accordance with Bohr's correspondence principle, are nevertheless considered to be more fundamental and absolutely essential if one is to obtain any level of predictability in the atomic world. Barnes, on the other hand, attempts to explain the phenomena in the microscopic world by the application of classical physics. Whereas in quantum theory the quantum laws are fundamental, in Barnes' theory the idea is to explain the quantum effects classically. Although the author has worked in this area for about 10 years and has made great strides in attaining the desired end (as is evidenced by the material in the book), he does not claim to have completed the task, as he states:

The alternatives presented in this book should be considered as tentative and incomplete. Rather than holding off until they are completely developed, the author has chosen to include them in their unfinished state. The purpose is to illustrate new ways of physical analysis in these areas of physics. (pp. 3, 4)

In this way Dr. Barnes demonstrates the plausibility of the classical approach and also provides a framework upon which others may build.

Classical physics might be defined as that area of physics where Newtonian or "common sense" principles apply. It was during the first third of the twentieth century that classical physics was discarded in

favor of the special theory of relativity and quantum mechanics. Some physicists had a difficult time in making the philosophical transition which was necessary and that included Einstein, who stated with regard to special relativity: "It is difficult to get rid of deep-rooted prejudices, but there is no other way." Had some physicist at that time presented a viable alternative to the special theory of relativity, one which did not abandon classical concepts, perhaps even Einstein would have accepted it. At any rate, Dr. Barnes presents such an alternative in *Physics of the Future* even though it may be 63 years too late.

The problem facing physicists at the turn of the century was that Maxwell's equations were not invariant between inertial frames of reference and no light bearing mechanism fixed in space to explain this result ("luminiferous ether") could be detected. Einstein's solution of the dilemma was to assume that all inertial frames of reference were equivalent and that the speed of light was the same for observers in each of those inertial frames. Consistent with these postulates he replaced the classical Galilean coordinate transformations with the Lorentz transformations, and this all led to the conclusion that time and length were not absolute. Barnes' solution, in contrast to that of the special theory of relativity, is to assume that in each physical situation a preferred frame of reference can be defined. It is the frame of reference associated with the largest body of matter in the vicinity of the laboratory and consists of the vector sum of the electromagnetic fields of the electric charges in that body. With this assumption the equations for the transformation of electromagnetic fields are derived. This theory is consistent with Maxwell's equations and does not abandon the Galilean transformations. Electromagnetic radiation (visible light included) is assumed to be a wave which propagates at speed c in the field of its source charge. As Barnes shows, such an interpretation is consistent with the results of the Michelson-Morley experiment.

The classical approach to electrodynamics developed in *Physics of the Future* opens up the way for the development of a new theory of elementary particles. The guiding philosophy of the book is that elementary particles are real physical entities which can be explained beyond a level of abstraction. The electron, for example, is visualized by Barnes to be made up of a thin, deformable, spherically-shaped layer of electric charge, the electric field produced by the charge, and the nonelectric field inside the electron holding the charge intact. With this model, Barnes is able to derive the equations for the increase in mass with velocity and the relationship between energy and mass. The increase in mass with velocity is shown to be an electromagnetic effect and provides a physical reason for the fact that the translational speed of a particle cannot be greater than or equal to the speed of light. As the electron is accelerated, an electric field is induced at the surface which acts backward on the charge, and the resulting inertial reaction force is shown to be consistent with Newton's laws of mechanics.

The proton structure is assumed by Barnes to be similar to that of the electron except that the charge is

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positive and the size smaller due to the proton's larger mass. All of the derived relationships for the electron then apply in the same way to the proton. The neutron is assumed to be made up of a proton and an electron. The proton is also assumed to possess a literal, intrinsic spin. Due to the size of the proton and the value of its magnetic moment, the velocity of the proton's surface as it spins turns out to be 861 times greater than the speed of light. In Barnes' theory of electrodynamics, however, there are no electric or magnetic fields prohibiting such a speed as in the case of a particle moving at a uniform translation velocity.

The magnetic force of attraction between two protons whose spins are oppositely aligned turns out to be greater than the electrostatic repulsion as long as the distance between the two protons is less than 497 times the proton's radius. In this manner Barnes is able to account in a general way for the strong force which holds the nucleus of the atom together. In another chapter, the force of gravitation is explained as a second order effect in the addition of the electric fields of the positive and negative charges in matter. This is consistent with the book's overall interpretation of mass as being made up fundamentally of electric charge.

Also incorporated in the book is a discussion of the experimental evidence regarding the ideas of modern physics. One of the key points made by the author is that the support an experiment lends to a theory sometimes depends upon the interpretation of the results. In three other chapters, Barnes includes a discussion of the hydrogen atom. Although his theory of the hydrogen atom is incomplete, he concludes on the basis of his studies that it may be possible to "... show theoretically that resonant physical vibrations in the hydrogen model can radiate the known hydrogen spectral frequencies." (p. 190)

The initial reason for the abandonment of the application of classical physics to the atomic level was its apparent inability to explain the observed phenomena coupled with the many successes of relativity and quantum physics. In *Physics of the Future*, Thomas Barnes reinvestigates the plausibility of the classical approach. Clearly, there is much work still to be done, but for those physicists who would like to believe in the principle of universality for the laws of physics, this book should be an encouragement.

What Do The Fossils Say — produced by John G. Read, Scientific-Technical Presentations, Culver City, California. \$49.50.

Reviewed by Paul A. Zimmerman*

Here is a film strip which provides the lay person with a simple and yet scientific presentation of the fossil record. The object of the film strip is to evaluate the fossils to see whether they better fit the theory of evolution or the theory of "abrupt appearance" (i.e., Creation or possible transportation from another planet).

An attractive and durable plastic case houses two reels of film strip and two tape cassettes. The com-

bined length of the presentation is 31 minutes. This is ideal as it makes it possible to use the presentation either in a class period or a lecture and still allow sufficient time for questions. A printed script is provided with discussion questions. Sound and picture quality is excellent. In the second half, however, the background music, at least for my ears muffled the sound cues to turn to the next frame. This can be overcome, however, by keeping an eye on the printed script.

The film is suitable for the public school market since it avoids any reference to a Creator or a Genesis account of Creation. However, it is also quite suitable for church schools and groups.

The scientific presentation summarizes well the requirements demanded of any theory which seeks to explain the record of the rocks. The abrupt appearance of life forms, the absence of transitional forms, the great gap between invertebrates and vertebrates, fish and amphibians, reptiles and birds, etc., are well documented. The famous cases of *archaeopteryx* and of fossil horses are well handled. The superiority of an explanation based on "abrupt appearance" (i.e., Creation) is nicely set forth as the viewer is challenged to draw his own conclusions.

The fossil record clearly does not support the theory of evolution. Nonetheless it also presents difficulties for the creationist. One might wish that the film strip had set forth this situation more clearly. Also, in the excellent section on fossil man a few more frames on fossils such as *australopithecus* would have been helpful.

The film strip and narration are well organized and easy to follow. From an educational point of view it appealed to this reviewer. It is a useful tool for either a science teacher or a lecturer on origins. The producer also offers to replace components damaged in normal use for a nominal fee.

Spading Up Ancient Words by Erich A. vonFange. 1984. Living Word Services, Syracuse, IN. 135 pages. \$3.80.

Reviewed by Paul A. Zimmerman

Dr. vonFange is a man of many interests. He is widely read and has traveled extensively. He has long been interested in the question of origins and is a firm believer in creationism. He is an amateur archaeologist. *Spading Up Ancient Words* is one of several books which are in preparation under the series name of *Surprises in Genesis*. It is a popular presentation of studies of ancient words and inscriptions with the purpose of seeing what this type of literary archaeology will produce in shedding light on the development of early civilizations.

On page 51 vonFange writes:

The root meaning of some modern words could well go back to interesting facets of the daily life of our remote ancestors. If in very ancient times man was the kind of world traveler and navigator described above, there ought to be some linguistic relics lying around to support such a view of the past. If we live on a young earth, there ought to be some evidences in languages of interactions among peoples before the great separation occurred at Babel.

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The author presents an impressive array of facts. One might wish that he had pulled together the many items in a more structured form. However, the reader is presented a great many bits of information from the past which provide tantalizing flashbacks to the early days of civilization.

The author is careful in not attempting to carry evidence from the past beyond the very tentative conclusions which responsible scholarship may draw. Among his conclusions the following quotation from page 80 is worth noting: "We see indications of deterioration after a previous higher level which hints of catastrophic events. We find no support at all for any kind of evolutionary development of language . . . The characteristics and events in language and the alphabet fit very comfortably within the framework of history as described in Genesis."

The book also contains an appendix of 31 drawings and photographs which add to the value of the presentation.

Evolution versus Creationism: The Public Controversy edited by J. Peter Zetterberg. 1983. Oryx Press, Tucson, AZ. 516 pages. \$37.50.

Reviewed by Wilbert H. Rusch, Sr.*

In his preface, the editor J. Peter Zetterberg, states that the purpose of the book is to assist his readers in the clarification of the issues in the controversy on macroevolutionism and creationism. It also purports to examine the arguments of the proponents of scientific creationism. The book had its genesis (apt word) in a conference, organized by the University of Minnesota and entitled EVOLUTION AND PUBLIC EDUCATION. This conference was held on December 5th, 1981. It was funded by grants from the Minnesota Humanities Commission and the Minnesota State Legislature, and sponsored by the National Association of Biology Teachers, the Minnesota Science Teachers Association, the Minnesota Association for the Improvement of Science Education, and the University's Center for Educational Development and Department of Conferences; certainly a formidable array of scientific, humanistic, and financial support. Not one of the advisors named in the preface was a creationist. The section given to creation is almost totally taken from Institute for Creation Research articles. Not one of the papers was prepared specifically for the Conference by a scientist who is also a creationist. Thus one could term this production anything but objective. This should be understood from the start.

I should probably begin with the title, which more properly should read *Macroevolutionism versus Creationism*, instead of *Evolution versus Creationism*. We encounter the usual semantic problem here. This is failing to distinguish between microevolution, which can usually be demonstrated and macroevolution, which cannot. This calls for the great leap of faith: if microevolution is true, *eo ipso* macroevolution must be true. This does not follow at all. However, I suppose an editor can call his book by any name he wishes.

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On page 4, there is the lofty statement by John A. Moore that "Neither am I aware of any movement by scientists to sponsor laws that mandate the teaching of evolution." Was not that what the Arkansas case was all about? In addition, apparently Moore is ignorant of the Velikovsky affair. This is all documented in de Grazia's *The Velikovsky Affair*. Here we find that scientists banded together to force Macmillan and Co. to cancel the contract to publish Velikovsky's *Worlds in Collision* under threat of boycotting the firm's science texts. In addition, Macmillan was forced to fire the junior executive who signed the contract with Velikovsky. Finally, the Hayden Planetarium in New York was forced to fire the curator for daring to offer a public program treating Velikovsky's theories as an open question. Moore is also probably ignorant of the firing of a teacher in South Dakota who was dismissed for presuming to teach creationism in his high school biology class. Incidentally, I believe that before that episode, he was awarded a top teaching honor. There is also the case of an administrator in the state of Washington who suffered a similar fate for proposing a balanced science program. Moore really should look up his facts.

A further indication of the tenor of this work is the implication found in a passage on page 10. In discussing the qualification of scientists who are on record as supporting creation, we read the following:

The list (of those who have been associated with creationist activities) contains no scientist who has not already compromised his objectivity by accepting the notion of a supernatural creation.

This sounds like a 'catch 22' situation because by the very nature of things, one could not be a creation scientist if he did not posit a supernatural creation! Moore presumes to limit the term *objective scientists* only to those who are not creationists. Yet we find others with bias without penalties. For example, Stephen J. Gould frankly admitting his bias towards punctuated equilibrium due to his being a Marxist. I wonder if one really can find an evolutionist scientist whose objectivity also is not suspect because he has accepted the notion of evolution.

In this issue of the CRSQ, you will find the obituary of John Grebe, a former member of the CRS Board of Directors. With a long list of honors, discoveries and patents credited to him, certainly by all standards, Dr. Grebe qualified as a scientist.

This review is not intended as a systematic critique of *Evolution versus Creationism*. That would require practically a whole book in itself. To thoroughly work through the 516 pages and look at every charge made would take more time than the writer is prepared to give. However, it might be worth while for some creationist to take on this task in the near future.

It is an old axiom that he who wishes to know the enemy, had better gain all the knowledge available about him. (*Fas est ab hoste docere.*) Therefore I would recommend that the serious student of origins ought to read this work. It will demonstrate the points made and the usual method of attack on creationism.

I reproduce the Table of Contents, which will give prospective purchasers an idea of which topics the book deals with—its scope, its arguments, etc. *Evolution versus Creationism* covers the following topics:

Preface

Contributors

Part 1 Evolution and Science Education

Evolution, Education, and the Nature of Science and Scientific Inquiry—John A. Moore

Nothing in Biology Makes Sense Except in the Light of Evolution—Theodosius Dobzhansky

Evolution: Fact? Theory? . . . Or Just a Theory—Malcolm Jay Kottler

Evolution: A System of Theories—Ralph W. Lewis

The Topic of Evolution in Secondary School Biology Textbooks: 1900-1977—Gerald Skoog

Part 2 The Creationist Movement

Creationism—John A. Moore

"Scientific Creationism"—A New Inquisition Brewing?—Preston Cloud

An Engineer Looks at the Creationist Movement—John W. Patterson

Decide: Evolution or Creation?—Frederick Edwards

Part 3 Stating the Creationist Position

Creation, Evolution, and Public Discussion — Duane T. Gish

A Two-Model Approach to Origins: A Curriculum Imperative—Richard B. Bliss

Summary of Scientific Evidence for Creation—Duane T. Gish, Richard B. Bliss, and Wendell R. Bird

The Scientific Case for Creation: Categories of Evidence—Walter T. Brown

N.B. much of the materials in this section are ICR reprints.

Part 4 Responding to the Creationist Challenge

Scientific Creationism and its Critique of Evolution—V. Elving Anderson

Answers to the Standard Creationist Arguments—Kenneth Miller

The Transition Between Reptiles and Mammals—Robert E. Sloan

Defining "Kinds"—Do Creationists Apply a Double Standard?—Frank T. Awbrey

Creationist Misunderstanding, Misrepresentation, and the Misuse of the Second Law of Thermodynamics—Stanley Freske

Finding the Age of the Earth: by Physics or By Faith?—Stephen G. Brush

Radiometric Dating and the Atmospheric Argon Correction in K/Ar Dating—E. Calvin Alexander, Jr.

The Association of "Human" and Fossil Footprints—Robert E. Sloan

Part 5 The Legal Issues

Why Creationism Should Not Be Taught as Science: The Legal Issues—Frederick Edwards

The Tennessee Anti-Evolution Act (1925)

The Tennessee Creationism Act (1973)

Proposed National Bill: An Act to Protect Academic Freedom and to Prevent Federal Censorship in Scientific Inquiry Funded with Federal Tax Monies

The Minnesota Creationism Bill (1978)

The Louisiana Creationism Act (1981)

The Arkansas Creationism Act (1981)

The Arkansas Decision: Memorandum Opinion in *Rev. Bill McLean et al. v. The Arkansas Board of Education et al.* (January 5, 1982)—William R. Overton

Part 6 Some Thoughts on Genesis as Science

On Giving Equal Time to the Teaching of Evolution and Creation—John A. Moore

Six "Flood" Arguments Creationists Can't Answer—Robert Schadewald

Creationism and Evolution: The Real Issues—N. Patrick Murray and Neal D. Buffaloe

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I was frequently reminded of the following quote from Thomas H. Huxley as my reading of the work proceeded. In 1893 he wrote:

There is not a single belief that it is not a bounden duty with them to hold with a light hand and to part with cheerfully, the moment it is really proved to be contrary to any fact, great or small. T. H. Huxley, *Darwiniana*, 1893, pp. 468-469.

This is my basic quarrel with macroevolutionists. They utterly ignore Huxley's advice. Despite frequent denials, macroevolutionists stridently demand the complete acceptance of their theory by everyone, insisting that it is entirely factual, or at least is the best theory available. In no way do they hold their theory with a light hand.

Regardless of the status of microevolution, when examined rigorously and objectively, macroevolution certainly does not stand up. Hence I do not accept the claims made for it. If macroevolution fails to stand up, then the creationists should be able to hold to their beliefs without ridicule or pressure. The rabid ravings of some of the present-day writers suggest they seem to fear creation as they would the devil.

I will give an example of what I mean. In reply to the paper *Six Flood Arguments Creationists Can't Answer*, I will reply in kind by giving an argument that neither macroevolutionists nor geologists can answer. In the Baltic region, we find a well-known substance called amber. Let me continue in the words of Heribert Nilsson:

The largest deposits are found in East Prussia, where layers of 3 meters may be found. Goepfert has estimated the amber in this region at 5 milliard kilos. It is quite obvious that these large quantities cannot have been formed on the spot. The theory is that they have their origin in resin from the conifers of the countries around the Baltic. But the conifers growing there do not normally exude resin in any quantities. It has, therefore been necessary to postulate that heavy attacks of diseases and immense forest fires have induced the effluence of large quantities of resin. Finally, some catastrophe has thrown the forests with their lumps of resin into the sea. The amber and pieces of branches, but no stems, have been transported by the sea to the coast of East Prussia. This is hardly an autochthonous process.

In the pieces of amber, which may reach a size of 5 kilos or more, especially insects and parts of flowers are preserved, even the most fragile structures. The insects are of modern types and their geographical distribution can be ascertained. It is then quite astonishing to find that they belong to all regions of the earth, not only to the Palaearctic region, as was to be expected. Typically tropical species occur, from the Old World as well as from the New. The same is the case with the plant fragments. Leaves of tropical trees from East India, Borneo, Australia, and South America are mixed with those from such homely shrubs as *Euonymus* and *Daphne* and weeds as *Polygonum convolvulus* and *Geranium molle*. The genus *Pinus* is represented, but so far as it is possible to judge from the needles, none of the species are at home around the Baltic; they are Japanese or North American. *Pinus succinifera*, which should be the source of the amber is a completely hypothetical species.

If the amber has originated around the Baltic, then the pine forests of Northern Europe should have housed such guests as the camphor tree from East Asia, the *Averrhoa* from Borneo, the *Quillaja* from South America, and the flowers of the land would have received insects from all over the earth. Only the dinner pail trees and the black bees from the Land of Oz are missing!

But, it is rejoindered, they are there together, encrusted in the amber. Therefore the climate must have been fairly warm, probably subtropical. Impossible! In a subtropical climate of today quite typical species of animals and plants are living, but it is quite inconceivable that side by side with these should have thriven biota from tropical and cold-temperate regions. It is impossible, because the climatic zonation of the earth can hardly have been different then from what it is now and because we are on the whole dealing with the same world of plants and insects. The geological and paleobiological facts concerning the layers of amber are impossible to understand unless the explanation is accepted that they are the final result of an allochthonous process, including the whole earth.

At a later point on the next page, after a description of the Gieselthal strata in Germany as well as the London clay, Nilsson comes to the following conclusion:

An allochthonous process of immense dimensions must be considered as absolutely necessary for the formation of the Eocene strata described. The fossils imbedded together have evidently been flooded there from all over the earth. Juxtaposition in the strata does not mean proximity during life; the conclusion must be considered as obvious.

I have included this material here to emphasize a point. Despite the allegiance to uniformitarianism, despite all pronouncements by historical geologists, the strata with respect to fossil content as reported by Nilsson in the Baltic region must be considered as evidence in support of a world Flood that Schadewald speaks of so contemptuously in his chapter. And this is the case in many other instances.

Evolution versus Creationism (continued).
Reviewed by Emmett L. Williams*

Introduction

It is the purpose of the editor to review some of the technical arguments offered against the use of thermodynamic principles in creationist presentations. This must necessarily be brief for most of the criticisms are not too profound or meaningful. Since the substance of most of the objections are given in this book, it is a good place to offer a rebuttal.

Already-Created Universe

Considerable confusion exists in the minds of evolutionary apologists concerning how creationist scientists employ their thermodynamic arguments. Thus many of their counter thrusts are off the mark. For instance, in trying to refute the claim that macroevolution could not have developed in the face of degeneration processes, evolutionists appeal to examples employing existing order in an already-created universe. For instance, consider the comment that the earth is not a closed system, implying that macroevolution can occur in an open system such as the earth-sun, where the sun floods the earth with energy. (pp. 122, 148, 171, 245, 254, 255, 285-287, 291) An already-created sun, earth, and life are assumed. This in no way answers the question, how did the original order develop? Can order *initially* develop naturalistically in opposition to degeneration processes? The creationist says no and points to the tendency in the present cosmos toward degeneration, and that there is no *observational evidence* for macroevolution. Thus with this firm foundation he claims that degeneration processes prohibit any naturalistic ordering of a system such as the universe and solar system. Assuming an already-ordered system cannot solve the problem and is an improper starting place to defend macroevolution. Once order has been created, conservation processes are able to generate larger quantities of order.¹

Growth

Often the concept of growth, and development of fertilized sperm into a mature adult is offered as a violation of creationist arguments (p. 290). The process of growth has been dealt with in creationist literature previously.² Growth is nothing more than a conservation process, and is at best, a replication of prior created order.

Boylan Paper

One of the essays appearing in this book levels several charges against a paper written by Dr. David R. Boylan.³ One claim is that Boylan confuses system and process (p. 155). A careful reading of Boylan's paper will reveal that such is not the case. He discusses irreversible processes occurring *within* a system.

Another charge is that Boylan's equations and entropy increase term are incorrect for a steady state (p. 156). In a steady state situation the entropy generated by the irreversible processes within the system is carried outside the system by the steady flow. The entropy generated internally is equal to the entropy removal from the system. The total entropy change is zero. This is often done in developing the steady state con-

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cept particularly when assuming living organisms are steady states.⁴⁻⁸ Boylan shows a positive entropy increase within the system ($dS_1 > 0$) which is swept out by the steady flow.

False Charges

Some statements made by counterattacking evolutionists are completely incorrect. For instance, one writer claims creationists such as H. M. Morris insist that life and its diversity violate the second law of thermodynamics (p. 148). This is simply not true and no evidence is offered to defend the statement. Later on the same page the author uses an example of the reduction of an ore to a metal by the application of energy in a designed system to show that creationist arguments are senseless! It requires intelligence (in this case, man) to generate order. Brute, unaided naturalistic processes do not create order from disorder nor can such processes reduce an ore to a metal. Already created, ordered systems designed to "multiply and fill the earth" can conserve the already existing order, but again *initial* order must be created, it cannot be evolved.

Another writer claims that creationists say that the second law as accepted by conventional science is incorrect and cannot explain natural phenomena (p. 288). This is also not true. Natural phenomena can be de-

scribed by a number of various processes, however there is no scientific law or process that can explain the *origin* of original order, this is the point made by creationists.

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LETTERS TO THE EDITOR

Carbon Problem Does Not Exist

In the March 1984, *Creation Research Society Quarterly*, Glenn R. Morton discusses the carbon problem. He assumes the preflood biosphere to have been equal to our present tropical forest. This is an obvious faulty assumption, based on several observations.

First, where in a present tropical forest would you find the huge herds of dinosaurs, mammoths, etc., that roamed the preflood earth?

Secondly, after the Flood the life span of man and possibly all living things decreased to about 1/10 of what they were before the Flood. So our present tropical forest can safely be assumed to be only 1/10 of what a preflood forest was like.

I'm convinced that the antediluvian biosphere exceeds our comprehension. I'm convinced that our present "lush tropical forest" is a sickly representation of the preflood biosphere.

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Reply to Eberly

I would agree that the assumption of a world-wide tropical forest is unrealistic since, indeed, large herds of ungulates would not have any place to live. And for this reason I would agree that the earth could not have been covered with a tropical forest. However, if the pre-flood earth had large areas of grassland, as would seem reasonable, then there would be even less carbon in the pre-flood biosphere for potential oil, gas, and coal formation than would be available from a world-wide tropical forest. Edward J. Kormondy notes:

In the earlier discussion, it was noted that tropical ecosystems are considerably more productive than their temperate counterparts. The greatest accumulation of organic matter is not only in forest systems, but is progressively greater toward the equator.¹

Thus the real problem is this: how do we explain the tremendous quantity of carbon found in the form of oil, gas and coal when even a worldwide tropical forest cannot account for it. Substituting grassland or any other ecology simply aggravates the problem.

I also cannot agree with the second objection that pre-flood forests were 10 times greater because organisms lived 10 times longer. Age has nothing to do with bulk of organic matter. When I was 18 and my grandfather 90, he was five times older but not five times bulkier than me. I therefore do not feel that it is safe to assume that the present forests are 1/10 of their predecessors simply because they might have lived longer. Older, bigger trees often block out so much light beneath them that very little can grow. Thus an older tree can mean less organic productivity.

Glenn R. Morton

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Quantum vs. Classical Physics

Articles appearing in the *CRSQ* generally assert that classical physics was discarded too hastily in favor of quantum theory. I would like to suggest that there is no basis for denying the superiority of quantum physics. This superiority can be shown not just with respect to the empirical evidence but also in quan-

tum theory's stronger relationship to the teaching of Scripture.

To see this let us start by noting that classical physics forms the foundation of the mechanistic/materialistic world view (That alone should cause the true, Bible-believing Christian to have doubts about its correctness). God is tacked on more as an afterthought than anything else and even at that His role is limited and not very flattering. He is needed to start the world going but after that the world runs perfectly well without Him, a fact which led the French scientist Laplace to remark that God was an unnecessary hypothesis in classical physics.^{1, 2} Only if God had made mistakes in the original design of the world would He have any reason to personally involve Himself in the operation of the post-Creation world. There is no place for free will in classical physics, everything is completely deterministic. In fact, because of this determinism man can in principle know as much as God! None of these facts, which are logical deductions from the principles of classical physics, are acceptable to a true Christian.

Now let us look at how quantum theory deals with these issues. To begin, the Heisenberg Uncertainty Principle implies man can never have complete knowledge of the world, even in principle, therefore he can never know as much as God (Do not fall into the error of thinking that intrinsic uncertainty from man's viewpoint implies intrinsic uncertainty from God's). This principle also allows for the fact that man can exercise his free will to change the course of his life toward salvation through Christ, which he would not have been able to do if we lived in a world of classical physics. God's continuous, pervasive participation in the events of the world is seen in quantum theory by interpreting the collapse of the wave function to a particular value as the action of God's Word. That is, He is continually upholding the world through the power of His Word to collapse the wave function, which is just the pre-observation probability that a particle will have any given position, momentum, energy, etc., to a particular value. That God created the world specifically for man is suggested by the fact that in the formal mathematics of quantum theory the wave function for an event does not collapse to a particular value until some person observes the event.

Notice that in quantum physics God does not have to be tacked on to an already complete theory, He arises naturally, as indicated above, from an interpretation of the formal mathematics. Clearly, someone approaching the question of classical vs. quantum physics from a Bible-centered viewpoint would expect the empirical evidence to favor quantum theory. In fact, the evidence in favor of quantum theory is so overwhelming that quantum physics is often described as the most thoroughly verified scientific theory in man's history.³⁻⁵ There are at least a dozen different phenomena which are easily explained by quantum theory but which should be impossible if classical physics is true.⁶

Consider the atoms of which virtually all matter on Earth is composed. According to classical physics all atoms are unstable; the orbiting electrons will collapse into the nucleus in a few trillionths of a second, making chemistry, and therefore life, impossible. Now Thomas Barnes has suggested that a spinning electron will generate a magnetic repulsion to counteract the

electrostatic attraction between the electron and the nucleus thus preventing the collapse of the atom. Unfortunately, this solution only works in a very special and unrealistic case. It requires the electron to be stationary (non-orbiting) and absolutely perfectly aligned with the nucleus. The tiniest movement away from perfect alignment and the electron would begin orbiting the nucleus, causing the atom to collapse. The only way to keep the electron perfectly aligned is to remove all other particles. That means Barnes' solution works only if the entire universe consists of a single hydrogen atom! In a universe filled with matter, like our own, classical physics cannot explain the stable existence of atoms. Quantum physics, on the other hand, has no problem with the stability of the atom because it predicts the existence of a minimum energy orbit below which an orbiting electron cannot fall.

There is one final point to be made. Some readers will no doubt be wondering why, if classical physics is wrong, do we venerate men like Newton and Maxwell as scientific geniuses? The reason is that classical physics is more accurately thought of as being incomplete instead of wrong. In the realm of large everyday-sized objects classical and quantum physics predict virtually identical behavior and they are, for many practical purposes, equally good theories. It is only when we get down to the scale of the atom that quantum physics emerges as unquestionably better than classical physics. Since the technology available to Newton and Maxwell was not advanced enough to permit exploration of the behavior of objects that small they cannot reasonably be faulted for failing to anticipate the change in the behavior of matter at such small scales. They are justly venerated for unifying the wide range of experimental data with which they were familiar under a single, elegant theory.

Hopefully, these observations will reassure creationists that quantum theory is neither unBiblical nor unscientific.

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Answer to Becker's Letter

Becker objects to the suggestion that classical physics was discarded too hastily in favor of quantum theory. However, Becker has been too hasty himself in his objections to the classical physics features proposed in my model of the hydrogen atom. It appears that he has not read my book¹ in which this model of the hydrogen atom was introduced, or he does not understand it. Every objection he raised is based on wrong information or analysis.

He claims that the atom is highly unstable, whereas the restoring forces in this model makes it very stable in the ground state. He claims that the electron would go into orbit, but the model was specifically designed to eliminate any orbiting. He claims that the electron would fall into the proton, but that is not true. His suggestion that the atom could only be stable if there were no other atoms in the universe is nonsense.

There are four classical physics flaws in the Bohr model of the hydrogen atom. This classical model of the hydrogen atom is designed to eliminate all four of those flaws. Becker apparently thought that those Bohr model flaws are still in this model. This achievement in classical physics was obtained through a number of years of research in which a classical theory of electrodynamics was developed to replace Einstein's relativity constraints. It showed that the peripheral speed of a proton can exceed the speed of light and yield a magnetic barrier sufficient to provide a stable classical atom. In the development of the theory of the electron, the quantum restriction on spin of the electron was rejected. The electron obeys classical induction principles. It was then shown to be a perfect diamagnetic body, which could never fall into the proton. It would then, by classical principles, meet the conditions needed for a ground state and would provide vibrational radiation when excited.

It is not my purpose to engage in a theological discussion with Becker. From my point of view classical physics shows the orderliness and predictability of God's laws in nature. It is notable that the best classical physicists have been great Christians. That includes Newton, Kepler, Faraday, and Maxwell. The following quote of one of Maxwell's prayers should allay any fears that classical physics leads one to reject the Scriptures:

Almighty God, who hast created man in Thine own image, and made him a living soul that he might seek after Thee and have dominion over Thy creatures, teach us to study the works of Thy hands that we may subdue the earth to our use, and strengthen our reason for Thy service; and so to receive Thy blessed Word, that we may believe on Him who Thou hast sent to give us knowledge of salvation and the remission of our sins. All which we ask in the name of the same Jesus Christ our Lord.²

I find it interesting that Becker considers quantum theory to lend support for free will. Why then is it one of the foundational principals of evolutionary cosmology? I never heard of an evolutionary cosmologist who believed in free will. They believe in the evolutionary emergence of the universe and life through eons of time and fortuitous chance. There is no place for free will in that philosophy.

More and more scientists are becoming disenchanted with relativity and quantum theory. Those theories are devoid of common sense input. That shows up in the twisting of interpretations to fit the mathematics. Becker illustrates that in his interpretation of the collapse of the wave function. In quantum theory the wave function itself has no physical meaning. It is strictly a mathematical construct. His statement, "the wave function for an event does not collapse to a particular value until some person observes the event"

illustrates how ridiculous the theory is. It takes a lot of twisting to use that in support of Scripture.

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Observations on Research Efforts

This letter was originally circulated in Britain, within the Earth Sciences Group of the Biblical Creation Society. (The Earth Sciences Group is an informal study group made up of interested BCS members.) It is reproduced here to encourage wider discussion of creationist research activities.

For some time it has been apparent that unusually large numbers of individualists are to be found in creationist circles. Psychologically, this is not surprising, as a robust and independent mind is often needed to stand against the tide of popular opinion. However, individualism does not always go well with good science, for teamwork is often required to tackle the problems with the necessary breadth and depth. The scientific enterprise involves many disciplines of study, and it is difficult for any one individual to develop a comprehensive expertise. As a result, the genuine polymath is a rare phenomenon. The scientific study of origins requires a multidisciplinary approach and, as a consequence, the cooperative activity of scientists with different kinds of expertise. The individualistic character of many creationists must be a major impediment to the development of creationism as a science.

The American creationists are recognising this problem and are seeking to do something about it. The Research Committee of the Creation Research Society recently reviewed the activities of the past 10 years (CRSQ, 1983, 20:125-126). They describe some of the research projects that had been undertaken:

As excellent as these works are, they are disjointed in the sense that each creationist followed his own line of interest and expertise, developing a particular topic. Generally, none of the work was coordinated with other efforts.

To encourage research, the committee decided to fund three projects in Christian colleges and several others outside these institutions. However, the end result was frustration and disappointment.

Finally, after years of hand-wringing, soul searching, etc. we reached the conclusion that the only way we could adequately obtain the required *coordinated* research effort would be to hire men, placing them in a facility where their activity could be regulated. Thus the dream of the CRS Laboratory was born.

What can be said about creationism in Britain? The wider community of Christian believers does not recognise the unhealthy effects of evolutionary concepts on our society, our thinking and our educational system—and has no thoughts of changing this situation. Those who are concerned are without the material re-

sources to invest in research facilities. However, this may not be such a disadvantage: people have always been more important than facilities! What matters is that those with these concerns *work together* to achieve *common goals*. It seems to me that until creationists are prepared to cooperate and to discuss issues together, we have no right to expect progress. Universities and industrial research departments think in terms of teams, not just individuals. The members of the teams contribute their own expertise to the solution of interdisciplinary problems. This, I believe, is the way forward for creationists today. To be specific, God has given each reader of this letter experience and skills which are peculiar to himself or herself—and the challenge is to find ways of making the best use of these varied resources. We wish to see creationism develop as an intellectual discipline, but do not expect this to occur without the stimulus and benefits of conference, debate and discussion. Surely, in this activity, we have barely made a start! [Feedback on these thoughts is invited.]

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Some Additional Comments on Concerning Several Matters (Part I)

In the June 1983 issue of the *Quarterly*, I had an exchange with Glen Morton.¹⁻² It was decided between Harold Armstrong and myself that I should have another opportunity to respond. I will attempt not to introduce any brand new material, except where absolutely necessary.

In retrospect, I noticed that some of the arguments used by Morton, especially with reference to ecological zonation, had been made also by Kitcher³ in his anti-Creationist book *Abusing Science*. Thus I, having answered Morton in my letter,⁴ inadvertently had also answered some of the criticisms made by Kitcher!

On Radiometric Dating and Its Plethora of Fallacies

In my original work (Sept. 1979 *CRSQ*) I had shown how non-fitting radiometric results are very common and are arbitrarily and conveniently explained away. Morton objected that radiometric dating, assuming constant decay rates, must have some validity because even the discrepant results show trends. I responded⁵ by showing that results in science do not have to be chaotic or random for a technique to be repudiated, and I also proposed a possible geochemical solution as a non-temporal explanation for such trends.

Morton then proposed two brand new arguments: that radiometric dating is accredited because there are more "too young" results than "too old" results; and he charged that I had quoted an author out of context. Actually, the fact that there are more "too young" values means very little, for something being "too young" or "too old" presupposes that there already is a "correct" value with which to compare all other results! That there are more "too young" than "too old" values probably only means that geochronologists have

come to believe that older results tend to be accurate, and hence have come to accept older results (selected from the welter of contradictory results) as being "correct." The history of Phanerozoic geochronology bears this out. Early time scales (as the Holmes 1959 version) had much younger values accepted as "correct" for geologic-period boundaries. When older results were obtained, there were two choices: take the older results as "correct" and explain away the Holmes (1959) scale as being based on "too young" results that had come from argon-purged and strontium-purged samples, or else keep the Holmes (1959) scale as "correct" and rationalize away the newly-obtained older results as containing "excess" argon and strontium. The former course of rationalizations was taken and that is why there now is a superabundance of "too young" results.

Now about the charge that I had quoted Mauger⁴ out of context: I shall let the reader judge for himself. (The part which Morton accused me of citing out of context in my Sept. 1979 *CRSQ* article is given in italics below). Mauger⁶ wrote:

In dating the Eocene mammal zones by K-Ar, we are faced with some serious limitations. The major mammal divisions may have time overlaps both in their upper and lower boundaries and stratigraphic interpretations necessarily accompany correlation of fossil zones with datable horizons. Environmental factors also must have affected the distribution of different animals. West and Dawson (1975) found that the spatial distribution of time-equivalent early Uintan and late Bridgerian faunas from the Sand Wash Basin (Colorado) were strongly affected by paleoecological factors. In the 40 to 50 m.y. time range, one can expect experimental errors of about ± 1 m.y. for single K-Ar dates. For air-fall tuffs however, the mineralogical quality for the samples is one of the most important factors that limits accuracy.

There are some serious problems in K-Ar dating of air-fall and/or reworked tuffs. These include mixing with older biotite from other sources and the effects of various degrees of post-depositional alteration. On the other hand, good data can be obtained in some areas. To have objective criteria of what constitutes a good sample, the investigator would be wise to have mineral separates analyzed on a microprobe. For biotite samples, iron, magnesium, and potassium determinations would be helpful. Utilizing the microprobe on biotite in the rock matrix could serve to identify degraded and/or bimodal populations before a mineral separation is attempted. For any determination, the mineralogical and analytical data including atmospheric argon and potassium content should be published. Citing only the age of a particular sample is not really adequate if the date is to be used in a geologic interpretation or if it is to be of value to other workers. *In general, dates in the "correct ball park" are assumed to be correct and are published, but those in disagreement with other data are seldom published nor are discrepancies fully explained.* Small scale or subtle discrepancies, which may be important in a comparison of radiometric ages and faunal zones, cannot

be evaluated nor perhaps even recognized without detailed mineralogic and analytical data.

The work of Evernden and others (1964) has been the standard for the radiometric dating of Tertiary mammalian faunas in North America. These four dates (Table 5) from the Wind River Basin merit special attention in view of my results. Sample 1012 (late Wasatchian) has a low potassium content and a high atmospheric correction, indicating that the biotite was degraded and the age is probably too young.

It should be obvious that the meaning of the cited statement is not materially changed in my citation, so the quote most certainly is not *out of context*. The point was and is that discrepant results frequently go unpublished, and the statement of Mauger beautifully illustrates it. Morton⁷ charged as follows:

When I first read that, I thought Mauger was talking about radioactivity in general. However, looking at the original, he was referring to one type of deposition (an air tuff) from one area.

It can be seen that Mauger is certainly *not* talking about datings from one area: he is obviously talking about *many* datings from *many* areas. Also, the fact that Mauger is focusing upon air fall tuffs is irrelevant, because: 1) air fall tuffs are the major source of Phanerozoic dates in the upper part of the geologic column and increasingly prominent even in the lower Phanerozoic geochronology; 2) all igneous-rock datings are basically identical and there is thus no basis for supposing that selective publications of dating results should be applicable only to tuffs and not to other datings; 3) in a broader context, Mauger *is* talking about general Phanerozoic geochronology and not isolated instances. In fact, from the subtitle of Mauger: "The Eocene Time Scale" it is clear that, in broader context, Mauger is reviewing the entire state of Tertiary geochronology. His quoting of West and Dawson (1975) and especially the classic work on *all* Tertiary radiometric geochronology by Evernden and others (1964) openly establishes the context of my citation as

being not violated in even a superficial sense. Thus, Mauger *is* surely talking about radioactivity in general!

The other quotes about discrepant results being unpublished I have re-checked, so I do not see any mis-reference. Morton⁸ also drew attention to my quote of Forman and stated that the author (however reluctantly) published a discrepant result. Yes, but that was not the point of my citing Forman. Having shown in the previous quotations that discrepant results in fact go frequently unpublished, I wished to summarize the section with the quote by Forman in order to show *why* they go unpublished. I thus showed Forman's *reluctant attitude* (his remark about "untidy" results) as illustrative of the fact that others must have like reluctant attitude but, unlike Forman, do *not* provide discrepant results. The fact that my summary was concerned about illustrating the *attitude* towards discrepant results is proved by my own words there: "Thus, a certain reluctance to provide a non-fitting date seems to be the case in this report by Forman: . . ." It can be concluded by reiterating that, since many (if not most) discrepant results go unpublished, it is hard (if not impossible) to compare the number of fitting versus non-fitting results. Since more severely deviant results preferentially go unpublished, it is not possible to determine the extent of any trends in the radiodate/biostratigraphic comparisons.

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8. *Ibid.*

John Woodmorappe

Answer to Akridge

Akridge's letter (CRSQ, 20:65) results from a misunderstanding. The whole basis of the velocity of light (c) decay research has been to uphold the energy conservation laws. Akridge is quite correct when he states that the approach advocated is that in which the permittivity of free space is taken to remain constant, but he is incorrect when he states that the permeability

would need to be constant for the magnetic energy to be conserved. There are, in fact, three possibilities in this matter, the one cited being that which accords most fully with the observations. Let me explain by means of the following Table based on the conservation of energy and Maxwell's Relation for a c decay situation.

MAXWELL'S RELATION

Electric Permittivity ϵ_0 & Speed of Light c
Magnetic Permeability μ_0

$$|\epsilon_0\mu_0 = 1/c^2|$$

For this to be true in changing c situation:

$$\begin{array}{l} (1) \\ \epsilon_0 = \text{CONST}; \mu_0 \sim 1/c^2 \\ \text{THEN} \\ V = m^2/(4\pi\mu_0 r) = \text{const} \\ \text{SO } m^2/\mu_0 = \text{const} \\ \text{magnetic pole } m \sim 1/c \end{array}$$

$$\begin{array}{l} (2) \\ \mu_0 = \text{CONST}; \epsilon_0 \sim 1/c^2 \\ \text{THEN} \\ V = q^2/(4\pi\epsilon_0 r) = \text{const} \\ \text{SO } q^2/\epsilon_0 = \text{const} \\ \text{unit charge } q \sim 1/c \end{array}$$

$$\begin{array}{l} (3) \\ \mu_0 \sim 1/c; \epsilon_0 \sim 1/c \\ \text{THEN} \\ \text{from (1) \& (2)} \\ m^2/\mu_0 = \text{const} = q^2/\epsilon_0 \\ \text{pole } m \sim 1/\sqrt{c}; \text{ charge } q \sim 1/\sqrt{c} \end{array}$$

Observational results favour (1) despite advantages of the symmetry of (3).

It will be noticed that the electric and magnetic potential energy (V) is conserved in each case, and in the first example the permeability is changing, BUT SO IS THE MAGNETIC POLE. This is the factor that Akridge ignores in his letter.

In the case of electromagnetic radiation including light itself there is another relation. The energy (W) of an electromagnetic plane wave is given as

$$W = (\epsilon E^2 + \mu H^2)/8\pi \quad (4)$$

where E is the electric field and H is the magnetic field. Now the magnetic field (H) is related to the magnetic pole (m) above by the relation

$$H = m/(\mu r^2) \quad (5)$$

and as in example (1) in the Table, which we follow by way of illustration,

$$m \sim 1/c \text{ and } \mu \sim 1/c^2 \quad (6)$$

then substitution of (6) in (5) results in the information that

$$H \sim c \quad (7)$$

This also checks out completely from Maxwell's Laws which state that

$$H = \sqrt{(\epsilon/\mu)} E \quad (8)$$

and as we follow through example (1) in the Table we have ϵ constant and μ proportional to $1/c^2$ then there results

$$H \sim cE \quad (9)$$

and as the electric field E is constant [example 1] then it follows that again

$$H \sim c \quad (10)$$

As we have from example (1) in the Table that μ is proportional to $1/c^2$ and from (10) that $H \sim c$ it means that the expression

$$\mu H^2 = \text{CONSTANT.} \quad (11)$$

Thus in (4) we have both the electric field and the magnetic field of a plane wave unaffected by decay in c. Accordingly, the Maxwellian expression

$$W = (\mu H^2)/4\pi = (\epsilon E^2)/4\pi \quad (12)$$

still holds good, and $W = \text{CONSTANT}$.

The final aspect of Akridge's letter concerns the dimming of light from distant objects. The argument does not apply directly to a sun-earth situation in which the number of photons emitted per second by the sun in the earth's direction and so received by the earth remains constant for all c (see the argument concerning stellar burning rates, etc., in my monograph, *The Velocity of Light and The Age of The Universe*, pp. 81-96). The whole concept is discussed fully in the above mentioned monograph (pp. 99-126), and especially p. 122 where it is discovered that the weakening of light is governed by the red-shift factor (Z) in such a way that the dimming is given by the factor (f) such that

$$f = 1/(1 + Z)^2 \quad (13)$$

This means that the most distant quasars are being dimmed by a factor to 1/25th of normal. The nearer quasars at about 1.8 billion light years (LY) being affected by a factor of 1/9th; objects 900 million LY away by $1/4$ and those 500 million LY away by just over $1/2$ in addition to the normal dimming with distance. The objects making up the 3°K background are dimmed much more severely—by a factor of 10^{-12} , though this is offset marginally by the fact that the volume of space occupied by these objects is over 1000 times greater than the observable universe and so many more objects are involved. In conclusion it might be pointed out that the c decay theory predicts the 3°K background AND the X-ray background and the link between them of a red shift factor of $Z = 10^6$. Further details are available from the monograph.

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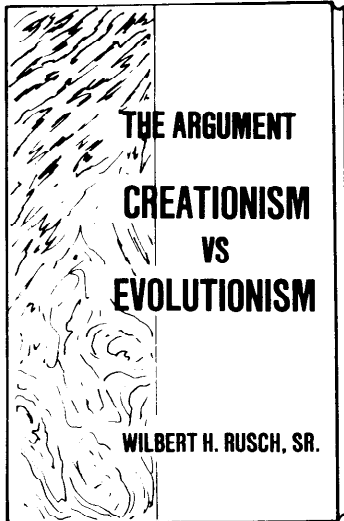
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Activities The Society is solely a research and publication society. It does not hold meetings or engage in other promotional activities, and has no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund is maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible.

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2. All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was an historic event worldwide in its extent and effect.

4. We are an organization of Christian men of science who accept Jesus Christ as our Lord and Saviour. The account of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Saviour for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Saviour.

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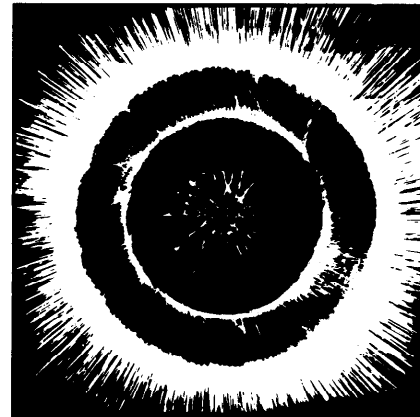
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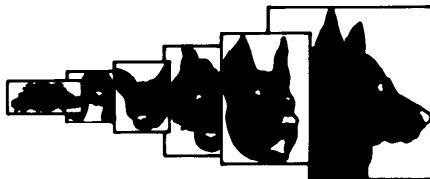
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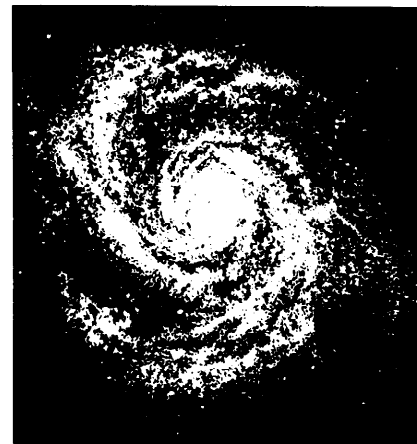


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