

Creation Research Society Quarterly

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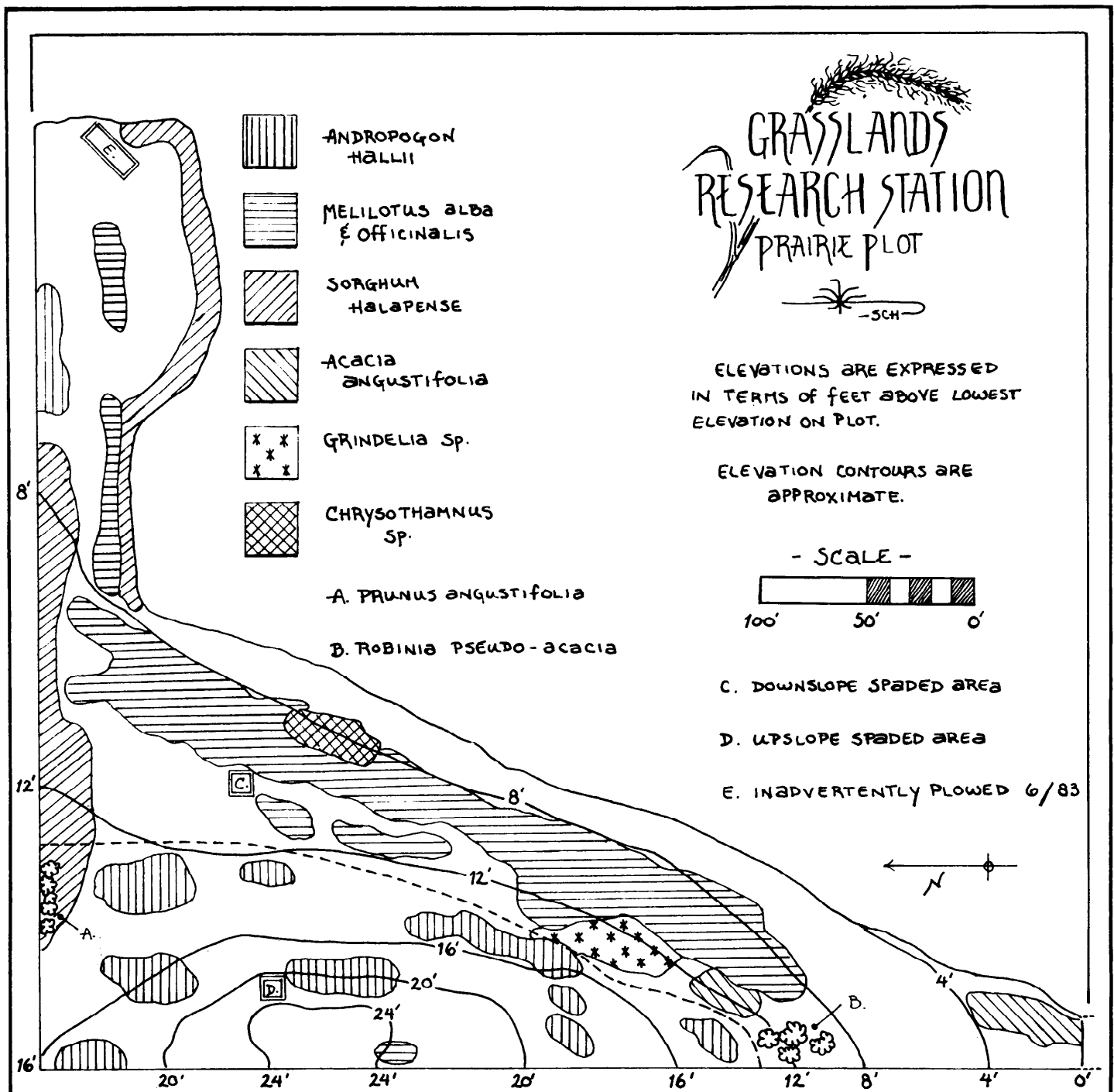
For in six days the Lord made heaven and earth, the sea, and all that in them is and rested on the seventh. — Exodus 20:11

Year

VOLUME 21

SEPTEMBER 1984

NUMBER 2



CREATION RESEARCH SOCIETY QUARTERLY

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VOLUME 21

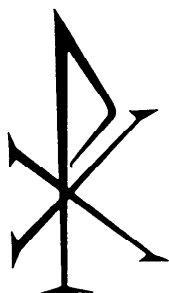
SEPTEMBER 1984

NUMBER 2

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Creation Research Society Quarterly is indexed in the *Christian Periodical Index*.

COVER ILLUSTRATION

Species distribution map for the Creation Research Society Prairie Plot, Grasslands Experiment Station. Indicated areas represent sizable, pure or nearly pure stands of the species listed.

Creation Research Society MEMBERSHIP REPORT (1983-84)

April 26, 1984

Classification	Total
Voting	608
Sustaining	889
Subscription	107
Student	178
Library	210
School	25
Church	4
Senior	66
Free Subscriptions to Donors	33
	2120

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PLACEMENT SERVICE

Do you know of academic vacancies to which Creationists might be directed? The Creation Research Society would like to be in a position to be able to inform Creation scientists of such vacancies. If you know of such positions, will you please inform Dr. John W. Klotz, 5 Seminary Terrace North, St. Louis, Missouri 63105, describing the position and the academic requirements and training required, and giving any other information which might be available?

Graduate students who are interested in placement may write to Dr. Klotz for information about any available positions which are known to the C.R.S.

APPLICATION FORM FOR THE CREATION RESEARCH SOCIETY

Four Groups can receive our quarterly publication. They are:

- 1) *Voting Members:* these shall have an earned degree in some recognized area of science at least at the level of the master's degree (M.A. or M.S.)
- 2) *Sustaining Members:* these are people with or without advanced degrees in an area other than science, who are interested in the work of the Society.
- 3) *Student Members:* these include high school and undergraduate college students, who wish to become acquainted with the work of the Society.
- 4) *Subscribers:* these include all libraries, schools, churches and other organizations, as well as any individuals who wish to know what the Society is doing, but who feel that they cannot sign the statement of belief. Organizations, by their very nature, cannot sign statements of belief.

In addition, all members (categories 1, 2, and 3 above) must subscribe to the following:

1. The Bible is the written Word of God, and because we believe it to be inspired thruout, all of its assertions are historically and scientifically true in all of the original autographs. To the student of nature, this means that the account of origins in Genesis is a factual presentation of simple historical truths.
2. All basic types of living things, including man, were made by direct creative acts of God during Creation Week as described in Genesis. Whatever biological changes have occurred since Creation have accomplished only changes within the original created kinds.
3. The great Flood described in Genesis, commonly referred to as the Noachian Deluge, was an historical event, worldwide in its extent and effect.
4. Finally, we are an organization of Christian men of science, who accept Jesus Christ as our Lord and Savior. The account of the special creation of Adam and Eve as one man and one woman, and their subsequent Fall into sin, is the basis for our belief in the necessity of a savior for all mankind. Therefore, salvation can come only thru accepting Jesus Christ as our Savior.

MEMBERSHIP APPLICATION BLANK

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I fully subscribe to the Statement of Belief of the CRS as stated above, and submit my application as one of the following:

- ☐ Voting Member; dues \$15.00/year \$17.00 overseas), includes subscription to *C.R.S. Quarterly*.
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My membership should begin with the June 19____ copy of the Annual Issue, since the publication year begins in June and continues through September, December and March.

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Please make out checks to the Society (CRS). Please DO NOT send cash. Foreign orders please use a check drawn on a U.S. bank, or an international money order.

EDITORIAL COMMENTS

The second in the series of invited articles is written by Dr. Tom Barnes to explain why he prefers his classical models to many of the constructs of modern physics. Dr. Barnes desires to restore causality to physics and replace probability and certain aspects of relativity. This non-mathematical paper should help some of our members who have struggled with Dr. Barnes' equations in the past.

Dr. E. Norbert Smith details the research potential at the Creation Research Society Grasslands Experiment Station. Work is continuing on plant succession studies since the availability of *original* grasslands as a base for research activities presents a unique opportunity.

The so-called ice ages seem to fascinate both laymen and professional scientists alike. Michael Oard submits a meticulous study on a uniformitarian concept of the ice ages and the evidence used in an attempt to verify the model. This detailed examination is serialized in three parts and later sections will appear in subsequent Quarterlies.

Another article to appear in parts is the biography of a Dutch creationist biologist, Duyvene De Wit. Dr. Magnus Verbaugge has collected Dr. De Wit's correspondence with Dr. George Howe and revealed some of the persecution a creationist suffered at the hands of his colleagues.

A speculative article on asteroidal impacts by David Unfred is presented in which the author appeals for a place in the creation model of science for such activity. Often these discussions can quickly leave the area of science and open the door for endless epochs of multiple catastrophism which can but confuse and muddle more reasonable approaches to catastrophism. As an antidote to Velikovskyism, the editor suggests reading a past Quarterly article.

Hanson, James N. 1978. Against catastrophic rationalism: gravitational attitude deflections of the Earth's axis, *Creation Research Society Quarterly*, 15:55-68, 72.

A special feature to appear in this and many future Quarterlies is the listing of various wrong-order geologic formations compiled by Dr. Walter E. Lammerts. These presumed overthrusts offer excellent library and field research opportunities for qualified creationists.

Dr. Jerry Bergman's in-depth book review reveals a very serious limitation of scientific activity, i.e., the human nature of scientists. This review should be required reading for anyone who worships science and scientists.

The editor earnestly hopes you will profit from many of the articles in this issue. Your constructive comments are always welcome.

Emmett L. Williams

INVITED PAPER

A UNIFIED THEORY OF PHYSICS

THOMAS G. BARNES

Received 24 November 1983. Revised 10 April 1984.

Abstract

Einstein's primary aim in physics was to develop a unified field theory. It is now eighty years since Einstein introduced relativity. Modern physics still has no unified field theory. This paper shows problems with relativity and quantum theory. It proposes novel adaptations of classical physics as a means of achieving a unification of physics. The four basic types of forces in modern physics are reduced to only one kind of force, the electromagnetic force.

Problems with Einstein's Relativity

Einstein's relativity was not accepted by a number of his contemporaries. Ernest Rutherford, the father of nuclear physics, considered it to be nonsense.¹ Columbia University astronomer Charles Lane Poor, in his 1922 book *Gravity Versus Relativity*² and in his 1930 *Journal of the Optical Society of America* article,³ gave a devastating refutation of the claims of Sir Arthur Stanley Eddington, that observations of the 1919 solar eclipse confirmed Einstein's predicted gravitational attraction of light. It was this "proof" espoused by Eddington that brought Einstein his first acclaim and greatest fame. Poor showed clearly that the actual observations were not what was claimed and that they did not support Einstein's prediction. This is still a

strong refutation of Einstein's presumed gravitational attraction of light. It means an unanswered challenge to Einstein's general theory of relativity and his theory of gravitation. As a side issue this relegates the concept of black holes to mere fiction.

In more recent times there have been a growing number of scientists who reject Einstein's relativity. One of the most noted was the late Herbert Dingle, FRS, a former President of the Royal Astronomical Society, author of two books on relativity, and author of two *Encyclopaedia Britannica* articles on Einstein's relativity. At first he subscribed to Einstein's relativity, but later came to realize that it had serious contradictions within the theory itself. The scientific "establishment" was incensed that a man of Dingle's reputation and knowledge of relativity would challenge the credibility of relativity. His articles were then systematically rejected by the leading journals. Dingle did not give up. He challenged the top scientists, in personal

*Thomas G. Barnes, D.Sc., Professor Emeritus of Physics, University of Texas at El Paso, receives his mail at 2115 N. Kansas St., El Paso, TX 79902.

correspondence, to answer his case against relativity. Their evasiveness and failure to meet Dingle's challenge is a sad story in the history of science. Dingle documents all of this in his book, *Science At the Crossroads*.⁴ This one book is sufficient to refute the whole gamut of Einstein's relativity, both the theory and the presumed observational and experimental evidences for it.

Dr. L. Essen, the world's leading scientist on time measurements and inventor of the atomic clock, rejects Einstein's relativity. He has written a book and numerous articles that expose serious errors in relativity. One article was published in the *Creation Research Society Quarterly*.⁵ This article is very important in that it refutes the claim that atomic clocks flown around the world confirmed Einstein's predicted shortening of time with motion.

The well-known British scientist G. Burniston Brown has written some of the clearest refutations of relativity. His article: "What is Wrong With Relativity?"⁶ is a masterpiece. He has also written a recent book that presents a classical alternative to certain areas of relativity.⁷ In another publication⁸ Brown states that:

Practicing physicists and astronomers who know some history of science do not accept 'Relativity' and even a distinguished theoretician, Leon Brillouin is calling, in his book, *Relativity Re-Examined*, for a 'Painful and complete re-appraisal' which 'is now absolutely necessary.'

Rejection of Quantum Concept of Light

The particle concept of light is a quantum concept called the *photon*. Its value of energy, its quantum of energy, is given by the expression $h\nu$ where h is Planck's constant, a very small number, and ν is the frequency associated with the photon. Einstein received the Nobel prize for this particle concept of light. He assumed that a single particle of light, the quantum of light, is the source of energy that ejects an electron in the photoelectric effect. Einstein is given credit for this as an original step in the development of quantum theory. However, Einstein rejected the modern formulation of quantum theory, objecting to its dependence upon probability and chance, as noted in his famous statement: "I do not believe God Almighty throws dice!"

The three following scientists have all rejected the photon of light concept and have pointed out overwhelming experimental and theoretical arguments against it: Henri Poincaré, Herbert Ives, and H. A. Lorentz. Ives, a Bell Telephone Laboratories scientist, presented an excellent and very comprehensive case against the photon of light in his 1951 Rumford Medal lecture.⁹ Incidentally, he has also done some outstanding experimental and theoretical work that refutes Einstein's special theory of relativity.¹⁰

Ives cites standing waves experiments in optics in refuting the particle concept of light. A standing wave pattern is formed by constructive and destructive interference between waves traveling in opposite directions. To have a standing wave pattern there must be *coherence*. Ordinary light is *incoherent*. Light radiated from different atoms is not in phase, not coherent. Experiments in optics indicate that coherence, once achieved, can persist over distances of at least one *each atom* must be more than a meter long. Each wave train has coherence over the entire coming-and-

meter. This means that the *train of waves emitted* by going distance involved in standing waves. A light particle can not be going and coming at the same time. Standing waves can not be produced by light quanta.

The following series of quotes are taken from Ives' famous 1951 Rumford Medal lecture.¹¹ They illustrate not only the strength of Ives' position against the quantum of light but also that of H. A. Lorentz and Henri Poincaré. Ives gives this quote from a 1910 address by H. A. Lorentz:

Nevertheless the speaker (Lorentz) holds the hypothesis of light quanta to be impossible, if the quanta are regarded as wholly incoherent, an assumption which is most natural and which is also made by Planck. . . . Lummer and Gehrke have observed interference at a phase difference of two million wavelengths; for yellow light, that corresponds to a length of one meter. If each quantum by itself should be capable of giving sharp interference, then it must also extend over that length in the direction of propagation. But, the lateral area of the quantum must also be considerable, which follows from the diffraction theory of optical instruments. Should a light quantum cover only one square centimeter of area, then it would be obviously senseless to fabricate large telescope objectives. . . .

In his photoelectric emission experiments Ives obtained the same photoelectric equation as Einstein's equation, including the energy quantity $h\nu$, but he associates that with the molecule on which light impinges, not with a single particle of light coming into the molecule. Ives states:

To this expression of dissent is to be added that of Henri Poincaré, who in his only published reference to Einstein remarks that while Einstein would put the quantum in the incident light, he, Poincaré, would place it in the molecule and he speaks elsewhere of finding the "vestibule" by which the molecule admits or releases energy in quanta.

Ives endorses that position and contends that wave theory puts $h\nu$ "in the *atom* and not in *radiation*."

Quantum theory considers light to have a dual nature, a particle nature (photon) and a wave nature. This Dr. Jekyll and Mr. Hyde relationship is supposed to be justified by Heisenberg's indeterminacy principle. One property is presumed to dominate under certain conditions, the other property to dominate under other conditions. The wave nature is supposed to dominate during *propagation* of light. The particle nature is supposed to dominate during the *interaction* of light with matter.

Ives' research on photoelectric emission, resulting from two planes of polarized standing waves, provides strong evidence against the photon concept. This is all the more important because Einstein had cited photoelectric emission as support for the photon. Ives states that this:

experiment showed how minutely the photoelectric emission followed the predictions made from the wave nature of light.

Ives considers the dual nature concept of light to be untenable:

Refuge has been taken from this unsatisfactory state of affairs by using wave description for some phenomena and photon description for others, and

it is claimed that the two types of phenomena are never met in the same experiment. I submit that the last experiment . . . certainly comes very close to showing both types of phenomena in conjunction. Electrons are emitted with energy $h\nu$, but they follow minutely the orders of the standing wave patterns.

He states that it is:

extremely difficult, if not impossible, to retain the idea of light as consisting of discrete photons.

The significance of these experiments, which I wish to impress upon you, is that it is the *optical* properties of the material, and the optical conditions of the region in which the phenomena occur, which explain these outstanding effects. I stress this because other attempts at explanation which have been made from quantum mechanical considerations, have almost uniformly neglected or ignored the optical factors. These instead of being secondary or negligible, really dominate.

Back to the Classical Physics Approach

There is no question but that there is a need for better foundations for modern physics and cosmology. Vannevar Bush is reputed to have said:

It is difficult to see how we can produce fundamental thinkers when our teachers cannot detect the fallacies in Einstein's theories, paradoxes and postulates, but instead rush to climb aboard the Einstein bandwagon where further straight thinking becomes impossible.¹²

This paper gives an overview of the author's efforts to develop new foundations by the aid of novel adaptations of old principles. It picks up the trail of physics where it had reached its classical peak, just before going "modern." It retains the philosophical view of classical physics, that there is a physical cause for every physical effect.

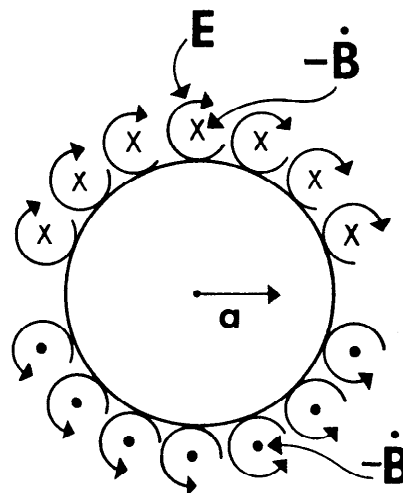
This is not a new venture for the author. He has, for years, been developing classical alternatives to various facets of relativity and quantum theory. Much of that has been published in technical papers in the *Creation Research Society Quarterly*.¹³⁻¹⁵ His new book, *Physics of the Future—A Classical Unification of Physics*,²⁰ makes use of those papers and adds some new developments. Progress has been made in the effort to reduce all of the forces of physics to nothing more than electric and magnetic forces, a unified theory of physics.

Electric Theory of Inertial Mass

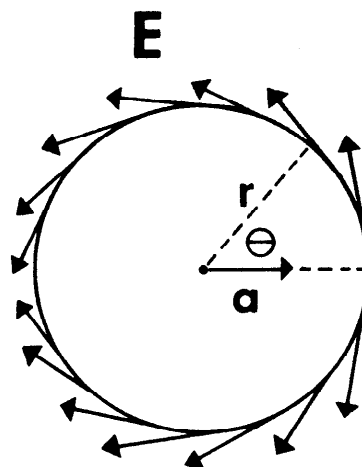
Newton's *third law* refers to an interesting physical phenomenon, to which there is no known exception: *For every action there is an equal and opposite reaction.* Action is the force applied to a body by some external source. Reaction is the force the body exerts back against the source. This reaction force is also called the *inertial* reaction, because *inertia* is that property of a body that reacts against being accelerated. If one should kick a brick with his bare toe he would be painfully aware of the brick's inertia. *The quantitative measure of inertia is mass.* Mass may be computed from this form of the equation for Newton's second law: $F = ma$, where F is force, m is mass, and a is acceleration. Knowing the force and the acceleration, one can compute the mass.

There is a law in electricity and magnetism which describes a somewhat similar reaction force, *Lenz's law*. If a copper ring is pushed over the *end* of a bar magnet, an electric current is induced in the ring. A *magnetic* reaction force acts backwards on the ring. That magnetic force is precisely equal to the action force when the ring is moving with *constant velocity*. If the ring is *accelerated* the action and reaction forces are equal, but the reaction force is the sum of this magnetic reaction and the conventional inertial reaction. This leads one to wonder whether or not the conventional inertial reaction force is also some kind of electric or magnetic force. The answer seems to be yes!

Using nothing more than classical electric and magnetic theory, the author derived the electric reaction force acting backwards on an accelerated classical electron.²¹ When that force is divided by the acceleration, it yields the precise value of the mass of the elec-



a. Directional sense of curl E induced by changing magnetic field during charge acceleration. E — electric intensity B — magnetic induction a — acceleration of charge.



b. Resulting electric field, E , acting backwards on the charge during acceleration. r — radius θ — angle between acceleration and radius vectors.

Figure 1.

tron, as one would expect from Newton's second law. The electromagnetic mechanism for this Newtonian reaction force is illustrated in Figure 1. Those familiar with Maxwell's equations will recognize in Figure 1a the induced "curling" electric field E generated by the changing magnetic field B , as the electron is accelerated. Figure 1b shows the direction of that induced electric field acting on the various locations of the charge (a surface charge). The vector summation (integration) of the elementary electric field forces over the whole charge yields the total reaction force on the electron. The resulting expression for the mass of the electron is

$$m = \frac{\mu q^2}{6\pi r} \quad (1)$$

where q is the electric charge in coulombs, μ is the magnetic permeability, and r is the radius of the electron, and the mass is in kilograms.

Here one has not only an electric equation for mass but also a physical explanation of Newton's third law for this case.

The author has not carried out this type of physical derivation to include the increase in inertial mass with speeds approaching the speed of light. However, he was co-author in a previous paper that did derive, without relativity, the same equation as the conventional relativistic equation for mass with velocity up to the speed of light.²² In that paper the emphasis was on energy. The author now chooses to put the emphasis on the inertial property of mass, showing that a distinction can be made between mass and energy.

Equation (1) works for a positive charge as well as a negative charge. It is also the electric equation for the inertial mass of a *proton*. The proton has the same value of charge but has 1,836 times as much mass as the electron. In view of Equation (1) the proton must have a 1,836 times smaller radius. This makes physical sense. The electric field and induced electric reaction force will certainly be that much stronger on this smaller sphere of equal charge.

In a previous paper an *electric* model of the neutron was proposed.²³ The neutron consists of an electron and a proton. All bodies are electrical in nature. That makes it possible to explain the inertial reaction force and associated inertial mass of all bodies as an electric property.

Electric Theory of Gravitation

A distinction is made between inertial mass and gravitational mass. Inertial mass is associated with Newton's second law. Gravitational mass is associated with Newton's universal law of gravitation. It requires different kinds of experiments to measure inertial mass and gravitational mass. But no one has been able to show any difference in the values of gravitational and inertial mass, so we ordinarily use them interchangeably, and make no distinction between them. An electric expression for gravitational mass has been deduced from postulates that relate to Newton's universal law of gravitation.²⁴ This enables one to explain the force of gravity as an electric force, an important step in the unification of physics and in making a distinction between mass and energy.

The electric force, the Coulomb law force, between electrons and protons is vastly larger than the gravitational force between them. So the gravitational force, if it is an electric force, must be due to some very

small alteration in the Coulomb force not previously included in electric theory. In the new theory, the Coulomb force on an electron or proton is altered to add an additional minute attraction due to an *overloading effect*, somewhat similar to a well-known overloading effect in electronics. Arnold Sommerfeld once suggested that a correction might be needed in electric theory in the immediate neighborhood of the electron "in such manner as the theory of dilute solutions in thermochemistry."²⁵ We postulate overloading when the force on one elementary charge is due to a like elementary charge. For example, there is overloading when the force on an electron is due to another electron. That overloading slightly diminishes the repulsion force. This is equivalent to adding a slight attraction force.

The overloading is assumed to be proportional to the electric field strength at the surface of the electron or proton. That makes the gravitational force greater on the proton than the electron, as one would expect. One should refer to the original paper for more details. This theory yields an electric force that is equivalent to Newton's gravitational force on electrons and protons. An extension of the electric theory of gravitation to all bodies is proposed by the assumption that all bodies consist of protons and electrons.

From this electric theory of gravitation one can deduce an electric equation for gravitational mass. This equation is somewhat more complicated than Equation (1), which is for inertial mass, but both yield the same value of mass. Both types of mass are expressed in terms of electric charge. The important point is *there can be no mass, inertial or gravitational, where there is no electric charge*. Light does not contain electric charge. Contrary to the claims of modern physics, light has no mass. Gravity does not exert an attraction force on light. This conclusion is in accord with Charles Poor's findings. He concluded on the basis of his analysis of solar eclipse observations that gravity does not attract light, does not bend light rays, as has been claimed for years.²⁶

Electromagnetic Hydrogen Atom Model

The Bohr model of the hydrogen atom has four serious defects, from the point of view of classical physics: 1) There can be no stable (ground) state in the Bohr atom. An orbital electron would *radiate* energy, gradually getting closer and closer to the proton until the atom dies. 2) There is no physical reason for the electron to "choose" the Bohr orbit even if it did not radiate. 3) Bohr provides no magnetic means of preventing an electron from falling straight into the proton, if the electron starts its fall from rest. 4) There is no vibratory mechanism for generating the Bohr spectral frequencies even if an electron did fall from one Bohr orbit to a lower one.

A new classical electromagnetic model of the hydrogen atom has been proposed.²⁷ One aim is to eliminate all of the classical defects which Bohr had in his model. The atom consists of a spinning proton and a distorted electron ring in circulatory motion as shown in Figure 2. The electron and proton are held apart by magnetic repulsion between these two electromagnets. The hydrogen spectral frequencies are generated by free vibrations of the high Q resonant modes in this electromagnetic system, once the atom has been excited by some input energy.

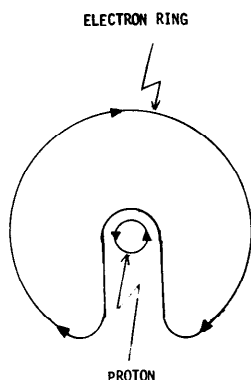


Figure 2. Model of the hydrogen atom.

The feasibility of this model of the hydrogen atom is made possible by several new developments. A new feedback theory of electrodynamics,²⁸ as opposed to relativistic electrodynamics, led to the realization that for certain cases where there is no feedback, speeds can exceed the speed of light. The limitation of the speed of an electron to the speed of light is due to a feedback force. The feedback occurs when there is a disturbance in the field as the electron moves by. A proton with a constant rate of spin, in the stable state of the atom, sets up no disturbance in the field and hence no feedback is generated. *The peripheral speed of the proton in this model is not subject to the speed of light constraint.*

If one takes the radius of the proton to be the classical radius, computed from Equation (1), and the published value of the magnetic moment, it can be shown that the peripheral speed of the proton will greatly exceed the speed of light.²⁹ What is more important, this excessive speed of the proton's charge generates a magnetic field stronger than ever before considered possible in an atom. It provides a magnetic repulsion force on the electron that is sufficient to yield the required balance between electric attraction and magnetic repulsion in the hydrogen atom.³⁰

Classically there can be no radiation from this electron ring while it is in the ground state of the atom. In order to have radiation there must be a disturbance set up in the field. There is no disturbance set up in the field because the configuration of the electron does not change. The field does not "see" any net positional change in the charge. Whereas the point electron in the Bohr orbital motion continually changes its position, setting up disturbances in the field. That is the reason it would continually radiate energy in the presumed stable state of the Bohr atom. The aforementioned new feedback theory of electrodynamics included a deformable electron, in accordance with the forces acting on it. The source of the forces that deform a spherical electron into the ring electron will be considered in the next section, where another of the quantum theory postulates will be rejected.

Induced Spin in the Hydrogen Atom

The quantum theory of modern physics imposes a constraint on the spin of an electron or proton, requiring the spin of the electron and proton to have a fixed value. Nothing is supposed to be able to change the value of spin of the electron or the proton. On the

basis of theoretical arguments by Lorentz and experimental results at the Argonne National Research Laboratory, this quantum constraint is rejected.³¹ The laws that work so well in electrical engineering are assumed to hold for the proton and the electron.

The proton is assumed to have an intrinsic spin, but its value of spin is altered by electromagnetic induction when it is subjected to an external magnetic field. The electron is assumed to have no intrinsic spin. It gains all of its spin as a result of electromagnetic induction. As the electron falls in toward a proton to form the hydrogen atom, the magnetic field of the spinning proton induces a curling electric field which causes the electron to spin. The electron's resulting magnetic field causes additional spin in the proton. This mutual coupling process between the two provides a continuing build up of spin until their final magnetic strengths are reached. The final spins of the two are assumed to yield magnetic moments (strengths of the magnets) equal to those listed in the literature.

The centrifugal force on the spinning electron causes it to stretch out of its spherical form into an electron ring as it approaches the proton. The magnetic force on that part of the ring closest to the proton causes an inward bulge in the ring as shown in Figure 2. This reduces somewhat the net electric attraction of the electron to proton because parts of the electron ring are below the proton while other parts are above the proton. It also provides a closer magnetic coupling, with perhaps 25 percent of the proton's magnetic flux linking the electron ring. The size of this electron ring is approximately the same as that of the Bohr orbit. In other words, the size of this model of the hydrogen atom is about the same as that of the Bohr model.

Spectral Radiation

The "natural" tendency for the electron ring to move into its stable position (ground state) is due to the *perfect diamagnetic property* of the electron. A diamagnetic body (electron ring) tends to be magnetically repelled toward the weakest region of the external magnetic field (the proton's). The electric Coulomb force attracts the electron, but the electron's diamagnetism balances out that attraction and guides the ring into the stable position (Figure 2) about which it can have many vibratory modes.

There is a *transformer* analog of the hydrogen atom. The spinning proton and revolving ring are analogous to the primary and secondary currents in a transformer. The energy delivered to the atom, as the electron falls in to form the atom, is transformed into magnetic energy. That magnetic energy is stored in the primary and secondary inductances and the mutual inductance. From the known magnetic moments and the dimensions of the proton and electron ring, one can compute the induced currents and the distribution of energy in the primary, secondary, and mutual inductances to confirm the feasibility of this model.³²

A crucial factor in this model is the coefficient of coupling, which is the fraction of the proton's magnetic flux that links the electron ring. The coefficient of coupling is a function of the effective separation of the electron from the proton, and the orientation and configuration of the electron ring. An assumed functional relation for this coupling in one of the simplest modes of vibration has been shown to yield a resonant vibra-

tion frequency in the Balmer spectral frequency range of the hydrogen atomic spectrum.³³

This model of the hydrogen atom has an extremely high Q . It is a perfect radiator in the sense that it has no ohmic loss. This extreme efficiency assures sharp spectral lines and wave trains long enough to satisfy the phase coherence required in the optical standing wave experiments.

$$Q = \frac{2\pi \text{ energy stored}}{\text{energy lost per cycle}} \quad (2)$$

The smaller the percentage of energy lost per cycle the more efficient the system, the higher its Q . A useful equation, $n = Q/2\pi$, tells the number of cycles, n , that a system will continue to oscillate before its oscillatory energy has been diminished to $1/e$ th (37%) of its original value. It is reasonable to assume that this model of the hydrogen atom may have efficiencies as high, or higher, than $Q = 2\pi \times 10^6$ for some of its vibrational modes. This would mean that there are more than one million wavelengths in the wave train emitted by one atom for that spectral frequency.

Much more work must be done before the exact configuration and dimensions are established and the various modes of vibration and precise spectral frequencies can be determined. Nevertheless this model appears to have much promise.

Summary

The innovations included in these new foundations for modern physics and cosmology include the following: 1) There is ordinary time and space, as opposed to relative time and space. There is neither a fourth dimension nor curved space. 2) Light is propagated in an "ether" medium that provides the mechanism for electromagnetic feedback which affects a moving charge's shape, mass, and associated field energy. 3) Electromagnetic induction works within the atom and provides the mechanism for Newton's third law as well as his second and first laws. There is no quantum constraint that forbids electromagnetic induction of spin. 4) The electron is a perfect diamagnetic body. There is no heat loss within this body. Its induced magnetic field always tends to repel the source magnet. Any magnetic flux linking the electron provides an induced current that persists, an important factor in the third law reaction for both the dynamic and static cases. 5) Bodies in constant rotation and with no altered "appearance" during that rotation will not radiate. The peripheral speed is not limited to the speed of light. This opens the way for a classical atom. 6) Lifting the relativity constraint on spin speed opened the way for stronger magnetic fields within the atom. That provides a classical means of holding the electron apart from the proton in both the atom and in the neutron. It also provides the force for holding two protons within the nucleus of an atom. 7) New classical models of the atom are made possible by the deformability of the electron and the increased magnetic field strength. The new configurations and force functions provide a multitude of new vibrational modes. These "new" free vibrational modes, together with the no internal loss characteristics, provide a classical means of yielding the atomic spectral frequencies. Spectral radiation occurs when the various free vibrational modes are excited. 8) Mass has charge. Light has no charge. It is massless and independent of gravitational

attraction. This means that there is a distinction between mass and energy. Light has energy but no mass. 9) The presumed four forces of modern physics: *electromagnetic*, *gravitational*, and the nuclear and atomic forces called the *strong force* and *weak force*, are all reducible to nothing more than electromagnetic force (electric and magnetic force). 10) Light is an electromagnetic wave, never a particle. It can exert pressure, as is true of acoustic waves, but it is not a stream of particles. The $h\nu$ in the photoelectric effect is the total wave energy absorbed by the atom at vibrational frequency ν .

The philosophical consequences of a return to classical physics are tremendous. It affects not only physics, but all of the disciplines, because of the widespread spill-over of relativism and indeterminancy. Causality is restored as a foundational postulate of science. Fortuitous chance is no longer considered to be the architect of the universe. Common sense is reinstated as an aid to progress and straight thinking, even in science.

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A REPORT OF ACTIVITY ON THE GRASSLANDS EXPERIMENT STATION FOR 1983

STEPHEN C. HAGBERG* AND E. NORBERT SMITH**

Received 23 October 1983.

Abstract

The research potential at the Creation Research Society Grasslands Experiment Station is discussed. A list of plants and animals available for study is given. Plant succession studies have been initiated.

Introduction

In years past much of the Great Plains region of central North America was covered with shortgrass and tallgrass prairies. The vast majority of this open prairie grassland has, with the advent of permanent settlement, disappeared or changed markedly due to the cultivation of crops, range grazing of livestock and the industrialization of the area. Very little land in the U.S. that was once prairie grassland now retains its original character in terms of species composition and relative abundance.

The Creation Research Society is fortunate to have access to a small plot of such original prairie grassland in southwestern Oklahoma (see cover illustration). The land is approximately seven miles southeast of the town of Weatherford, located on the extreme northwest corner of Section 11, R14W, T11N, of the soil survey map for Washita County, Oklahoma.¹ The 3.5 acre plot has never been under plowed cultivation although it has been subject to winter livestock grazing for at least 70 years.

Physical Description of the Plot and Climatological Data

The soil type is described as Quinlan-Woodward complex (5-12 percent slope).

This complex consists mainly of small areas of shallow and moderately deep, well drained, sloping and strongly sloping soils on ridge crests and hillsides on uplands . . . The Quinlan and Woodward soils are so intermingled that they could not be separated in mapping at the scale used.

Quinlan loam makes up 45 to 60 percent of each mapped area. Typically, the surface layer is reddish brown calcareous loam about 6 inches thick. The subsoil, which extends to a depth of 19 inches, is red calcareous loam. Light red calcareous sandy siltstone is below a depth of 19 inches.

Natural fertility and the organic matter content are low. Permeability is moderately rapid, and runoff is rapid. The available water capacity is low, and the root zone is shallow.

Woodward loam makes up 20 to 35 percent of each mapped area. Typically the surface layer is

reddish brown calcareous loam about 8 inches thick. The subsoil, which extends to a depth of 32 inches, is yellowish red calcareous loam. It is underlaid by red calcareous sandy siltstone.

Natural fertility and the organic matter content are medium. Permeability is moderate. Runoff is medium to rapid, depending on the slope. The root zone is moderately deep.²

The climate for this region of southwest Oklahoma is generally characterized by precipitation averaging 28 inches of annual rainfall and eight inches of snow/sleet annually, mild winters and long, hot summers. The average length of the growing season is 210 days with the average date of the first freeze being November 2 and the last freeze April 5.³

Wind tends to be from the south, with northerly winds prevalent in winter months. Strongest winds are usually in March, while August is generally the calmest month.

Traditionally, the "driest" month is January, and May is the "wettest." A secondary maximum of precipitation usually occurs in September. Most of Oklahoma experiences thunderstorms on the average of 50 days each year. Tornadoes are also not infrequent in this area of Oklahoma.⁴

More detailed data are available in the table of Climatological Means and Extremes for Weatherford, Oklahoma, included in Appendix A.

Botanical Description of the Plot

Preliminary research into the types of species present on the plot, their relative abundance, and their distribution over the plot are summarized in the species list in Appendix B, and the species distribution map.

The Gramineae family (grasses) accounted for the largest estimated portion of total groundcover (Figure 1), as was to be expected. Other families well represented in their area of coverage at the plot include the Leguminosae, Compositae, and Solanaceae. See Figures 2 and 3.

The impression gained from the preliminary studies of the plot is one of two distinct floral communities, for working purposes labelled as "upslope" (below the dashed line on the species distribution map), and "downslope" (above the dashed line). These areas can be noted on the cover illustration.

*Stephen C. Hagberg receives his mail at Trinity Evangelical Divinity School, Deerfield, IL 60015.

**E. Norbert Smith, Ph.D., is Director, Grasslands Experiment Station, Rt. 5, Box 217, Weatherford, OK 73096.

Representative plant associations for each community are listed below:

Upslope: *Andropogon hallii*, *A. scoparius*, *Chrysanthamnus* sp., *Hedyotis nigricans*, *Bromus japonicus*.

Downslope: *Acacia angustissima*, *Apocynum cannabinum*, *Aristida* sp., *Bromus japonicus*, *Chrysanthamnus* sp., *Grindelia* sp., *Melilotus alba*, *M. officinalis*, *Solanum carolinense*, *Andropogon scoparius*.



Figure 1. Sand Bluestem grass, *Andropogon hallii*, on the upslope portion of the plot.

Zoological Description of the Plot

This region of western Oklahoma is situated between native shortgrass prairie to the west and tallgrass prairie to the east. There are also many relic intrusions of mixed oak/juniper communities. Unfortunately, many of these have recently been cleared to increase tillable acreage. The ecotonal location of the Grasslands Experiment Station provides excellent species diversity of both plants and animals. Both "eastern" and "western" species of amphibians, reptiles, birds and mammals are found in the immediate vicinity of the plot.

Appendix C contains partial species lists of the more abundant animals found in the area. Only permanent residents or those known to reproduce are listed. Of course, many migrating birds visit the vicinity twice a year and some species winter in the area. Those are excluded from this list.

Research Accomplished or Initiated to Date

1. A series of plant collections was made at the plot, beginning the first week in July and continuing about once a week through the first week in September. The collected specimens were pressed and identified. The pressed specimens were then mounted on herbarium sheets and labeled as a start towards a permanent herbarium collection for the prairie plot. The identities of the herbarium specimens were confirmed by comparison with other regional collections.

2. The collections and visits to the plot also led to the development of a partial species list for the plot,



Figure 2. Yucca and grass on upslope portion of the plot.

along with a roughly mapped estimation of topographic and species distribution data.

3. Two 1m x 1m square plots were spaded up at the plot on August 26 and 27, at the locations marked on the map. The upslope area was dug down and spaded over to a depth of approximately 8 - 10 inches over the entire sample area. At this depth the very hard calcareous underlayer was reached limiting root penetration. The downslope area was spaded over to a depth of 10 - 12 inches (see Figure 4). Both areas were permanently marked by paint-tipped iron rods driven in at the corners. Ultimately, this will allow further study to be done on the course of plant succession on these plots.

4. Two soil samples, also taken from upslope and downslope areas, were extracted and sent for analysis to the local soil conservation office. The results indicated no major differences in soil pH (7.7 upslope, 7.9 downslope) or nitrogen levels between the two, but large differences in the amounts of potassium and phosphorus available. The upslope area contained 298 lbs/acre of potassium compared to 421 lbs/acre for the downslope. The downslope area, however, contained 17 lbs/acre of phosphorus compared to 37 lbs/acre on the upslope sample.



Figure 3. Clover on the downslope portion of the plot.



Figure 4. Spaded area on the downslope portion of the plot.

Future Directions of Research

The research done in 1983 was primarily designed to initiate further long-term studies of various aspects of this prairie plot and the grassland floral and fauna species which inhabit it. With this in mind, several areas of continuing interest and research are indicated:

1. The herbarium collection now started, should be expanded to cover the entire range of species present at the plot and include the entire growing season. Expansion to include species from surrounding areas would also be quite useful.

2. Some type of transect study or quadrat sampling analysis should be undertaken to establish accurate species representation and distribution information. Eventually a plot composition study could be published using this data.

3. A year-to-year follow-up on the successional changes on the small disturbed areas is necessary. Possibly a larger study of this type might be initiated.

4. Some attempt could be made to isolate and identify the factors responsible for the division between "upslope" and "downslope" communities at the plot. Tentatively, these observed differences are attributed to the soil type differences and depth of horizon involved in the Quinlan-Woodward soil distinction discussed earlier.

5. In the past most small mammal studies have been conducted in relatively undisturbed areas such as wildlife refuges or open rangelands. Notable exceptions dealt only with investigations of crop damage and methods to control mammal nests. Fleharty, in a recent paper in the *Journal of Mammalogy*⁵, argues that since agriculture is here to stay, investigations must be made on mammals inhabiting man-made ecosystems. The Grasslands Experiment Station is ideally situated in prime wheatland and future studies could be done to determine the effects of wheat farming on small mammal population dynamics.

Apart from the contributions to general scientific knowledge in the areas of botany, zoology and ecology, the work done at the plot could also serve as a basis for future understanding of the events leading up to and the factors involved in the perpetuation of prairie grasslands in a post-Noahic flood scenario. Future ecological studies using the rich diversity of plants and animals at the Grasslands Experiment Station may

perhaps cast additional light on the entire origins question.

"But now ask the beasts, and let them teach you; and the birds of heaven and let them tell you, or speak to the earth, and let it teach you, and let the fish of the sea declare to you." (Job 12:7-9).

Acknowledgements

Grateful acknowledgement is made for the funding provided by the Research Committee of the Creation Research Society. The Hansen Research Foundation provided logistics and secretarial support for the project. George Howe, Los Angeles Baptist College contributed many excellent suggestions for this study, helped with the experimental design and reviewed an early version of the manuscript.

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Figure 5. Sand Bluestem grass.

APPENDICES

APPENDIX A

Climatological Means and Extremes for Weatherford, Oklahoma*

MONTH	TEMPERATURE MEANS			TEMPERATURE EXTREMES		PRECIPITATION TOTALS			MEAN NUMBER OF DAYS			
	Daily Maximum	Daily Minimum	Monthly	Record High	Record Low	Mean	Maximum Monthly	Mean Snow, Sleet	Precip. .10 In. or More	Precip. .50 In. or More	90° and Above	32° and Below
Jan.	49.3	25.7	37.5	92	-12	1.00	4.31	2.0	2	0	0	22
Feb.	54.4	29.3	41.7	90	-14	1.03	3.76	1.8	2	1	0	15
Mar.	63.9	36.8	50.4	103	-2	1.53	5.49	1.9	4	1	0	12
Apr.	72.9	46.9	59.9	98	20	2.75	8.52	0.2	5	2	1	2
May	80.6	55.9	68.3	104	30	4.54	13.04	0	8	4	5	0
June	90.2	65.4	77.8	111	43	4.28	13.78	0	5	2	18	0
July	95.4	69.2	82.3	112	52	2.52	7.86	0	5	2	25	0
Aug.	95.6	68.6	82.1	115	45	2.52	8.82	0	4	1	28	0
Sept.	87.5	61.0	74.3	109	32	2.57	8.22	0	3	1	16	0
Oct.	75.4	49.5	62.6	100	14	2.59	11.45	Trace	4	2	3	1
Nov.	61.9	36.5	49.2	92	9	1.13	7.44	0.3	2	0	0	11
Dec.	51.2	28.0	39.7	89	-7	1.24	4.56	1.8	3	1	0	20
Year	73.2	47.7	60.5	115	-14	27.70	43.69	8.0	47	17	96	83

*Prepared from Oklahoma Weather, England, G.; Page 106.

APPENDIX B

Partial Species List

Group A: Widely distributed in large amounts and/or present in sizeable pure stands.

<i>Acacia angustissima</i>	(Prairie Acacia, Sensitive Plant)
<i>Andropogon hallii</i>	(Sand Bluestem) See Figure 5.
<i>Andropogon scoparius</i>	
var. <i>neomexicanus</i>	(Little Bluestem)
<i>Bromus japonicus</i>	(Cheatgrass, Japanese Chess)
<i>Chrysanthemum</i> sp.	
<i>Grindelia</i> sp.	
<i>Hedyotis nigricans</i>	(Star Violet)
<i>Melilotus alba</i>	(White Sweet Clover)
<i>M. officinalis</i>	(Yellow Sweet Clover)
<i>Solanum carolinense</i>	(Wild Tomato)
<i>Sorghum halapensis</i>	(Johnson Grass)

Group B: Isolated individual plants or clumps, distributed over wide areas of plot.

<i>Apocynum cannabinum</i>	(Indian Hemp)
<i>Bouteloua curtipendula</i>	(Side-Oats Grama)
<i>Elymus canadensis</i>	(Canada Wild Rye)
<i>Eriogonum longifolium</i>	
<i>Opuntia</i> sp.	
<i>Stenosiphon virgatus</i>	
<i>Tradescantia occidentalis</i>	(Western Spider-wort)
<i>Yucca glauca</i>	(Yucca, Small Soapweed)

Group C: Isolated individual plants, relatively few on the plot, not widely distributed.

<i>Cynodon dactylon</i>	(Bermuda Grass)
<i>Dalea aurea</i>	(Golden Dalea)
<i>Gaura biennis</i>	
<i>Mentzelia stricta</i>	(Showy Blazing Star)
<i>Oenothera serrulata</i>	
<i>Physalis heterophylla</i>	(Clammy Ground Cherry)
<i>Prunus angustifolia</i>	(Sand Plum, Chickasaw Plum)
<i>Robinia pseudo-acacia</i>	(Black Locust)
<i>Solanum rostratum</i>	
<i>Stachys</i> sp.	

APPENDIX C

Partial Species List

Not all the species listed would necessarily be found at the plot at any given time. Most, however, would include it as part of their normal yearlong range of activities.

AMPHIBIANS:

Salamander	
<i>Ambystoma tigrinum</i>	(Tiger Salamander)
Frogs	
<i>Rana pipiens</i>	(Leopard Frog)
<i>Rana catesbeiana</i>	(Bull Frog)
<i>Acris crepitans</i>	(Cricket Frog)
Toads	
<i>Bufo cognatus</i>	(Great Plains Toad)
<i>Bufo woodhousei</i>	(Rocky Mountain Toad)
<i>Scaphiopus bombifrons</i>	(Plains Spadefoot Toad)
<i>Scaphiopus couchi</i>	(Couch's Spadefoot Toad)

REPTILES

Turtles	
<i>Chelydra S. serpentina</i>	(Snapping Turtle)
<i>Kinosternon flavescens</i>	(Yellow Mud Turtle)
<i>Pseudemys scripta elegans</i>	(Red-eared Turtle)
<i>Terrapene o. ornata</i>	(Eastern Ornate Box Turtle)
Lizards	
<i>Phrynosoma cornutum</i>	(Texas Horned Lizard)
<i>Eumeces obsoletus</i>	(Great Plains Skink)
<i>Crotaphytus collaris</i>	(Collared Lizard)
<i>Sceloporus undulatus</i>	(Fence Lizard)
<i>Chemidophorus sexlineatus</i>	(Six-lined Racerunner)
Snakes	
<i>Leptotyphlops dulcis</i>	(Blind Snake)
<i>Natrix rhombifera</i>	(Diamond-backed Water Snake)
<i>Thamnophis sirtalis</i>	(Garter Snake)
<i>Heterodon platyrhinos</i>	(Eastern Hognose Snake)
<i>Coluber constrictor</i>	(Blue Racer)
<i>Masticophis flagellum</i>	(Coach Whip)
<i>Elaphe guttata</i>	(Corn Snake)
<i>Elaphe obsoleta</i>	(Rat Snake)
<i>Pituophis melanoleucus</i>	(Bull Snake)
<i>Lampropeltis getulus</i>	(King Snake)
<i>Holbrookii sayi</i>	(Speckled King Snake)
<i>Lampropeltis calligaster</i>	(Prairie King Snake)

BIRDS

<i>Corvus brachyrhynchos</i>	(Common Crow)
<i>Troglodytes aedon</i>	(House Wren)
<i>Mimus polyglottos</i>	(Mockingbird)
<i>Toxostoma rufum</i>	(Brown Thrasher)
<i>Turdus migratorius</i>	(Robin)
<i>Lanius ludovicianus</i>	(Loggerhead Shrike)
<i>Sturnus vulgaris</i>	(Starling)
<i>Passer domesticus</i>	(House Sparrow)
<i>Sturnella neglecta</i>	(Western Meadowlark)

<i>Icterus glabula</i>	(Baltimore Oriole)	<i>Cryptotis prava</i>	(Least Shrew)
<i>Quiscalus quiscula</i>	(Common Grackle)	<i>Scalopus aquaticus</i>	(Eastern Mole)
<i>Molothrus ater</i>	(Common Cowbird)	<i>Procyon lotor</i>	(Raccoon)
<i>Richmondia cardinalis</i>	(Cardinal)	<i>Taxidea taxus</i>	(Badger)
<i>Melospiza melodia</i>	(Song Sparrow)	<i>Mephitis mephitis</i>	(Striped Skunk)
<i>Buteo jamaicensis</i>	(Red-tailed Hawk)	<i>Canis latrans</i>	(Coyote)
<i>Circus cyanens</i>	(Marsh Hawk)	<i>Citellus tridecemlineatus</i>	(Thirteen-lined Ground Squirrel)
<i>Cathartes aura</i>	(Turkey Vulture)	<i>Geomys bursarius</i>	(Plains Pocket Gopher)
<i>Colinus virginianus</i>	(Bob-white Quail)	<i>Dipodomys ordi</i>	(Ord Kangaroo Rat)
<i>Zenaidura macroura</i>	(Mourning Dove)	<i>Peromyscus maniculatus</i>	(Deer Mouse)
<i>Tyto alba</i>	(Barn Owl)	<i>Peromyscus leucopus</i>	(White-footed Field Mouse)
<i>Bubo virginianus</i>	(Great Horned Owl)	<i>Neotoma floridana</i>	(Eastern Wood Rat)
<i>Chordeiles minor</i>	(Common Nighthawk)	<i>Rattus norvegicus</i>	(Norway Rat)
<i>Archilochus colubris</i>	(Ruby-throated Hummingbird)	<i>Sigmodon hispidus</i>	(Hispid Cotton Rat)
<i>Charadrius vociferus</i>	(Killdeer)	<i>Dasypus novemcinctus</i>	(Armadillo)
MAMMALS		<i>Lepus californicus</i>	(Blacktail Jackrabbit)
<i>Didelphis marsupialis</i>	(Opossum)	<i>Sylvilagus floridanus</i>	(Eastern Cottontail)

ICE AGES: THE MYSTERY SOLVED?

PART I: THE INADEQUACY OF A UNIFORMITARIAN ICE AGE

MICHAEL J. OARD*

Received 11 July 1983, Revised 20 April 1984

Abstract

The old astronomical theory of the ice ages, based on slight long-term changes in the earth's orbital geometry, is now believed to be the solution to the mystery of the ice ages. However, the changes in solar radiation are too small to cause an ice age, especially for the dominant eccentricity cycle. There are many problems with climate simulations, and research indicates it is practically impossible to initiate glaciation over Northeastern North America under uniformitarian conditions.

I) THE ASTRONOMICAL THEORY OF THE ICE AGES

A) Introduction

There are many theories of the ice age or ages, all of which have serious difficulties. However the astronomical theory of the ice ages has become popular recently. This theory states that ice ages resulted from differences in solar radiation due to cyclical variations in the geometry of the earth's orbit around the sun. These variations are: 1) changes in the eccentricity of the earth's orbit; 2) the precession of the equinoxes; and 3) changes in the tilt of the earth's axis. This theory is not new, but has existed over a hundred years. What is new, however, is its revival in the past 15 years due to statistical correlations with oxygen isotopes in deep-sea cores. Most earth scientists now believe that the long-standing mystery of the ice age has finally been solved. The purpose of this paper is to show in detail that the mystery remains unsolved within the uniformitarian framework.

B) Historical Development

1) EARLY ACCEPTANCE

The theory that long-term orbital variations have caused the ice ages is attributed to Milutin Milankovitch, a Yugoslavian meteorologist.^{1, 2} However, several men before him believed that orbital variations caused the ice age. The astronomer, John Herschel, in 1830 was apparently the first to suggest that these variations might affect climate.³ In 1842, Joseph Adhémar, a mathematician, published *Revolutions of the Sea*,⁴ in which he theorized that the precession of the

equinoxes was the mechanism for the ice ages in the hemisphere furthest away from the sun during winter. Parts of his theory were later proved wrong. James Croll elaborated on Adhémar's theory by including the eccentricity and obliquity cycles.⁵ However, the latter concept was not well understood at that time. After detailed celestial mechanical calculations had been made by astronomers for all three orbital variations, Milankovitch derived the secular change in incoming solar radiation in the past for various latitudes. Consequently, he is credited with the theory, which is also called the Milankovitch theory or mechanism. As improvements in the orbital data of the planets became available, his calculations were updated several times. The recent calculations of Vernekar⁶ and Berger⁷⁻⁹ are the standard today. Berger is considered the most accurate because he used more terms in his series expansion equations, but Vernekar's results agree reasonably well with Berger's, especially for the past 400,000 years. (References to geological time or long ages in this paper are used for the sake of discussion and are not to be construed as belief in the uniformitarian, evolutionary time scale.)

Due to Milankovitch's influence in the 1920's, most European geologists accepted his theory by the 1940's. This was mainly due to apparent confirmation from the previous work of Penck and Bruckner on gravel terraces in the Alps.¹⁰ They found four gravel terraces that they attributed to four ice ages, the timing of which seemed to fit the Milankovitch cycles. Penck and Bruckner's research was revised when others discovered more than one gravel deposit in each terrace. It is interesting that this new information conforms to the astronomical theory even better,¹¹ especially since no "absolute" dating was available at that time.

*Michael J. Oard, M.S., receives his mail at 3600 Seventh Avenue, South, Great Falls, MT 59405.

2) DISILLUSIONMENT IN THE 1950'S AND 1960'S

Interest in the Milankovitch theory waned in the 1950's and 1960's due to many contradictions with the new radiocarbon dates from peat and other deposits found between layers of glacial till.¹² In addition, many meteorologists claimed that the radiational changes were too small to have caused ice sheets. Regardless, a few scientists clung to the theory because of the cyclical nature of both ice ages and the astronomical theory and because it is the only one that can be "tested" by geology.

3) MODERN REVIVAL IN THE 1970'S

The efforts of the few believers came to fruition during the 1970's after the advent of sophisticated scientific techniques applied to deep-sea cores. The Milankovitch theory was finally "confirmed" by matching oxygen isotope cycles in cores with the radiation cycles. The key paper was published in 1976 in *Science* by Hays, Imbrie, and Shackleton entitled: "Variations in the Earth's Orbit: Pacemaker of the Ice Ages."¹³ An easy-to-read historical summary leading up to the "solution" can be found in the book *Ice Ages Solving the Mystery* by John Imbrie, one of the principal researchers, and Katherine Palmer Imbrie, his daughter.¹⁴ "By the mid-1970's, scientists could state, with confidence, that the ice ages came and went over the past million years mainly because of changes in climate due to orbital eccentricity, axial tilt, and axial precession."¹⁵

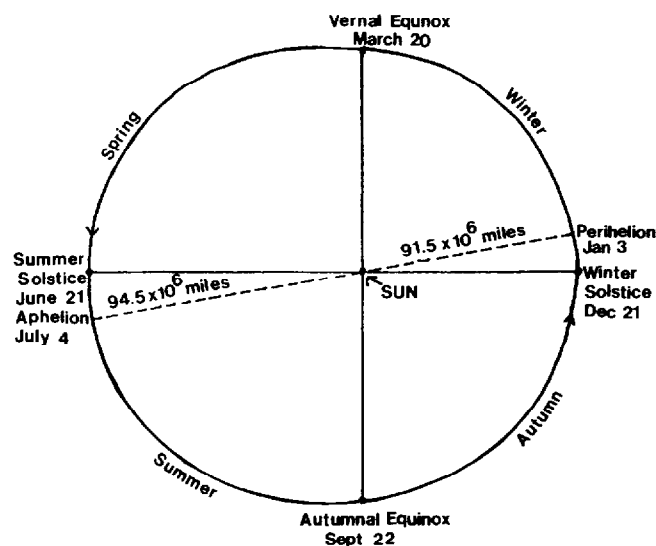


Figure 1. The current geometry of the earth's orbit around the sun. (Redrawn from Imbrie and Imbrie, 1979)

C) Orbital Variations

1) ECCENTRICITY

The earth's orbit around the sun is an ellipse (Figure 1) with a current eccentricity of .017 (zero is a perfect circle and one is a straight line). However, over geological time, the eccentricity varies from near zero to .06 with two major periods of approximately 413,000 and 100,000 years.¹⁶ This variation is caused by the gravitational pull of the other planets in the solar system. Figure 2 shows the changes in the earth's eccentricity extrapolated backwards for two million years.

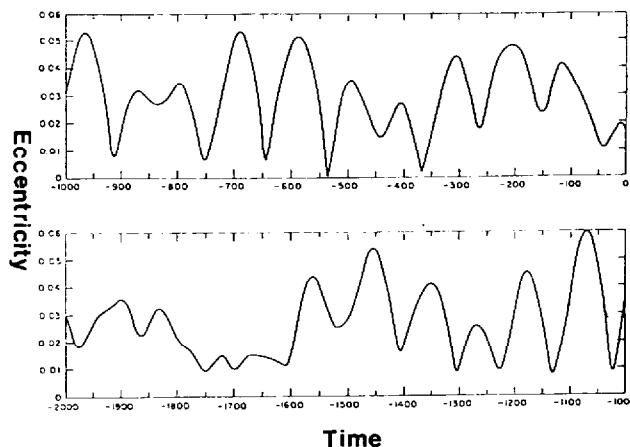


Figure 2. The variation in the earth's eccentricity for an assumed past two million years. Units are in thousands of years. (Vernekar, 1972)

2) PRECESSION OF THE EQUINOXES

A second variation in the earth's orbit is the precession of the equinoxes, also called the change in the longitude of the perihelion, which is the nearest approach of the earth to the sun. The precession of the equinoxes is actually the resultant of two forces acting on the earth's orbit. First, the equinoxes and solstices are forced to rotate clockwise along the earth's orbit due to the differential gravitational attraction of the poles and the earth's equatorial bulge by the sun and moon.¹⁷ Second, the orbital ellipse itself rotates counterclockwise but at a much slower rate. Another way of viewing the precession of the equinoxes is to look at the earth from the position of the fixed stars. Over a long period of time, the axis of the earth's rotation wobbles like a spinning top (Figure 3). The period, which is defined as the time for one rotation of the vernal equinox to the same point on the orbit, is about 21,000 years.¹⁸ Currently, perihelion occurs on January 3rd (Figure 1), and the Northern Hemisphere receives

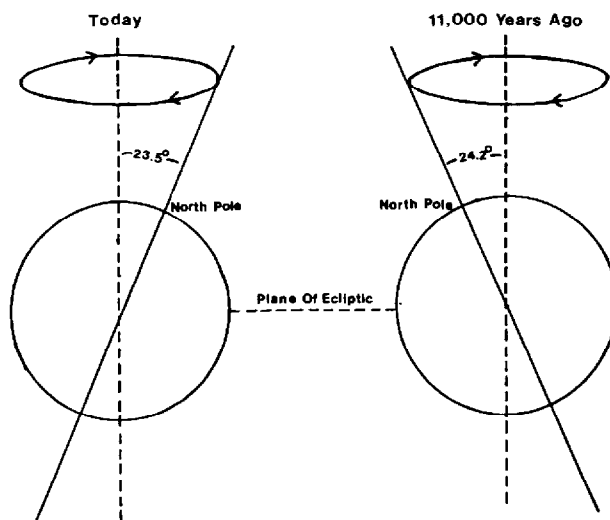


Figure 3. The change in the earth's axis as seen from the fixed stars between today and 11,000 years ago. Also included is the change in the tilt of the earth's axis. (Redrawn from Fodor, 1982)

slightly more solar radiation in winter than in summer. In about 11,000 years, the pattern will reverse (Figure 3), and the Northern Hemisphere will receive more radiation in summer. Figure 4 shows the variation of the precession extrapolated over the past two million years.¹⁹ The amplitude of the change is not even, but is modulated by the eccentricity cycle, which also changes over time. Figure 4 is actually a graph of $e \cdot \sin(w)$, where e is the eccentricity and w the longitude of perihelion as measured from the moving vernal equinox. In reality, the eccentricity mainly affects the radiation impinging on the earth through the precession cycle.^{20, 21} If the orbit were circular, the precession would not change the radiation on the earth since in each season the earth would be the same distance from the sun. When the eccentricity is large the precession cycle would have a relatively large radiational effect.

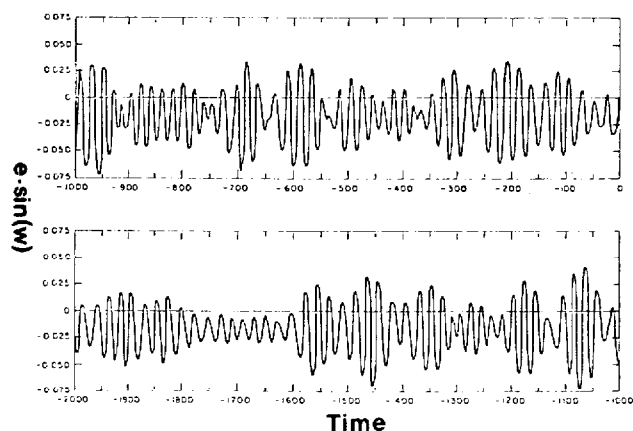


Figure 4. The variation of the precession of the equinoxes, modulated by the change in the eccentricity of the earth's orbit. Units are in thousands of years. (Vernekar, 1972)

3) THE EARTH'S TILT

The third long-term variation of the earth's orbital geometry is the change in the tilt of the earth's axis with respect to the orbital plane. This is also referred to as the change in the obliquity of the ecliptic. Currently, the tilt is 23.5° . Due to a wobble in the earth's axis, the tilt varies from 22.1° to 24.5° with a period of approximately 41,000 years.²² Figure 3 shows the change in the tilt for one-half the precessional period. Figure 5 is a graph of the relatively regular variation of this orbital element calculated for the past two million years.

4) COMBINED RADIATIONAL CHANGES

The three orbital variations do not change the yearly amount of radiation received by the earth as a whole, except for a very small change due to the eccentricity. Nor do they change the yearly total falling in each hemisphere.²³ The Milankovitch mechanism changes the seasonal and latitudinal distribution of the solar energy. The tilt cycle redistributes the radiation latitudinally in each hemisphere. A decrease in the tilt from 23.5° to the minimum of 22.1° would cause less radiation north of 43°N , but is balanced by more radiation south of 43°N . The precession cycle affects the seasonal partition of solar radiation. A decrease in

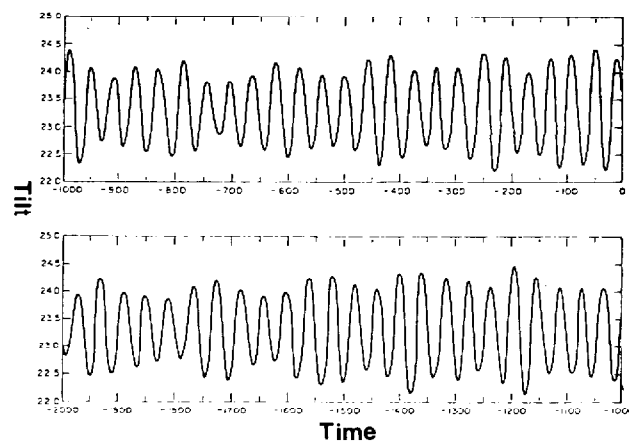


Figure 5. The variation in the tilt of the earth's axis for an assumed past two million years. Units are in thousands of years. (Vernekar, 1972)

winter radiation is balanced by an increase during the summer and is opposite in the Northern and Southern Hemispheres.

Because of the possible combinations, there has been controversy over which latitude and season is the most important for causing an ice age. The astronomical theory is plastic enough that practically any ice age timing can be predicted: "Depending on the latitude and season considered most significant, grossly different climate records can be predicted from the same astronomical data."²⁴ Adhémar and Croll believed cool winters were the most favorable.²⁵ However, the summers would most likely be warmer and cause more melting than occurs today, which was a problem with their models. Milankovitch favored cool summers and warm winters with the most important latitude 65°N .²⁶ Kukla, a few years ago, felt autumn was the most significant season.²⁷ Most paleoclimatic researchers today side with Milankovitch.

Figure 6 shows the net change in solar radiation in langleys per day from the present as a function of latitude for the top of the atmosphere calculated from 160,000 years ago to 50,000 years into the future due to all three orbital variations combined.²⁸ A langley is the amount of radiation in calories absorbed on a square centimeter in one minute. Figure 6 is for the Northern Hemisphere caloric summer which corresponds to the Southern Hemisphere caloric winter. A caloric summer is defined as that half of the year where every day has more radiation than the other half, which is then the caloric winter. Figure 6 shows that the precession cycle with its approximate 21,000 year period predominates at low latitudes and is twice as strong as the tilt, which is concentrated at higher latitudes. The current average radiation at 65°N between April 1st and September 30th, which is close to the caloric summer, received at the top of the atmosphere is about 750 langleys/day.²⁹ Comparing this with the numerical value in Vernekar's monograph³⁰ of 17 langleys/day at 65°N , 25,000 years ago, before the peak of the last ice age, shows that the caloric summer radiation was only 2.3 percent less than today. The anomaly is greater north of 65°N , but much less to the south. Further examination of Figure 6 shows that the latitudinal distribution of above and below average radiation is complex. Sometimes below normal radia-

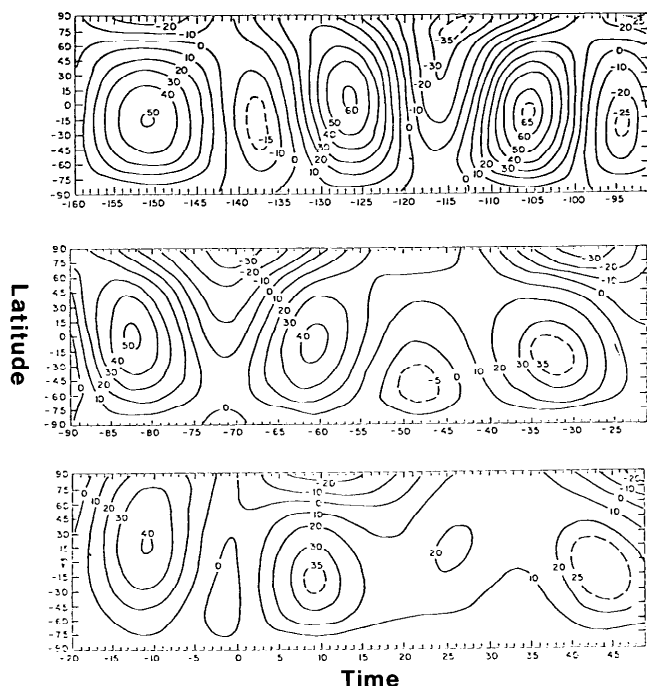


Figure 6. The net change in solar radiation in langley per day received at the top of the atmosphere of the Northern Hemisphere caloric summer for an assumed time interval of 160,000 years in the past to 50,000 years in the future. Minus latitude is for the Southern Hemisphere. Units are in thousands of years. (Vernekar, 1972)

tion at higher latitudes occurs with above normal values at lower latitudes of the Northern Hemisphere, for example at about 30,000 and 150,000 years ago. At other times, the whole Northern Hemisphere is below normal, as at 70,000 and 115,000 years ago.

II) METEOROLOGICAL PROBLEMS WITH THE ASTRONOMICAL THEORY OF THE ICE AGES

A) Introduction

Is the recent jubilation in "solving the mystery" of the ice ages premature? Is the Milankovitch mechanism the solution to the mystery? Not all paleoclimatic researchers agree. Oerlemans recently said: "In spite of all efforts, however, the cause of the ice ages cannot be said to be known."³¹ Pollard and others stated in 1980: "There is little agreement as yet on the dominant causes of the Quaternary ice ages . . ."³² With these comments in mind from well-known scientists in the field, the author will take a deeper look at the solution. Meteorological problems of the astronomical theory will be discussed. Analysis problems of deep-sea cores will be dealt with later.

B) Changes in Radiation Small

Many scientists in the past have pointed out that the cyclical changes in radiation of the Milankovitch mechanism, especially at high latitudes, are too small to cause an ice age.³³⁻³⁶ The 2.3 percent anomaly at 65°N, 25,000 years ago, becomes even less when the mid and high latitudes are considered as a whole, since the mid latitudes contain more area than the high latitudes. If the whole Northern Hemisphere is included, the summer anomaly will fall to less than one percent.³⁷ No matter what area is considered, the change in radiation really is small. Paltridge and Platt,

radiation specialists, state: "Milankovitch's proposition that the variability is sufficient to explain certain changes of the extent of polar ice is questionable to say the least . . ."³⁸ In focusing on major problems in polar research, Washburn states, in referring to the Milankovitch theory: "Yet the mechanism and quantitative adequacy of the effect pose major difficulties . . ."³⁹

It is difficult to know how a small radiation anomaly will affect the surface temperature because many other atmospheric and oceanic processes interact in a complex way. These processes, called feedbacks, can amplify or dampen an anomaly. Some of these damping mechanisms to a negative radiation anomaly are exhibited in the present atmosphere during the seasonal change:

When the pole cools in winter, the north-south temperature gradient increases, tending to produce more northward heat transport which would counteract the cooling. A colder pole would also produce less outgoing IR (infrared) radiation which would also counteract cooling.⁴⁰ (Parentheses added.)

Research indicates that damping mechanisms predominate: "A number of feedback mechanisms have since been investigated as to their importance in causing major climate change. In many instances the results have been more-or-less negative."⁴¹ The reason for this is probably because the earth is an efficient heat engine and must be viewed as a whole, and not with the high latitudes isolated. Most of the energy that heats latitudes higher than 50° is transported by the atmosphere and ocean from lower latitudes. In comparing these "night-storage heaters" to the Milankovitch changes, Sir Fred Hoyle states:

If I were to assert that a glacial condition could be induced in a room supplied during winter with night-storage heaters simply by taking an ice cube into the room, the proposition would be no more unlikely than the Milankovitch theory.⁴²

Consequently, a negative summer radiation anomaly would likely cause only a slight temperature drop of, at most, a few degrees, which would not cause an ice age.

C) Atmospheric Climate Simulations

1) INTRODUCTION

Despite the small changes of radiation in the astronomical theory of the ice ages, atmospheric climate simulations for the past have recently shown that these small changes can cause ice ages.⁴³⁻⁵³ Fluctuating ice sheets have been modelled to the tune of the tilt and precession cycles. Even the eccentricity cycle, now the dominant frequency, has been duplicated by a few researchers with the aid of amplifying mechanisms. These results seem impressive and are tantamount to proof of the Milankovitch mechanism. However, there are many simplifying assumptions and unrealistic parameterizations in these models, and the results have been subjectively forced.

2) FORCED AGREEMENT

Simplifying assumptions in climate simulations are common, mainly for practical reasons, since extensive computer time is required for computations. Also many atmospheric and oceanic processes are poorly understood. Several examples are annual averages, land-sea averages, and linear or statistical relationships for complex nonlinear mechanisms. The latter are

called parameterizations, and the results can be very sensitive to the values used.⁵⁴

For example, Weertman⁵⁵ notes that changing the value of one parameter by less than 1 percent of its physically allowed range made the difference between a glacial regime in one portion of an experimental run, while leaving the rest virtually unchanged.⁵⁶

It is common practice to manipulate these parameterizations until the desired results are approximated. This is essentially what Pollard⁵⁷ has done. After two previous failures to model the dominant 100,000 year glacial/interglacial cycle,^{58,59} he used a bedrock-ice sheet loading time parameterization and other "unrealistic parameter values"⁶⁰ with many computer runs until the desired results were obtained. The goal, of course, was to match the model to the oxygen isotope results of deep-sea cores. Oerlemans⁶¹ also has duplicated the 100,000 year frequency with an amplifying mechanism. He suggests that eccentricity has nothing to do with this frequency, but that it is a function of isostatic readjustment to ice sheet loading and unloading, which indicates the problems of modeling this cycle. He admits that the parameterization in his model for isostatic readjustment is crude and he adjusts his time scale until the assumed cycle is reproduced. Again, the results have been forced with repeated experimentation. Calder⁶² simply assumed that an ice sheet automatically develops when the radiation at 50°N drops 17 langley/day below the present. A quick glance at Figure 6 reveals that cyclical ice ages, highly correlated to the astronomical theory, are not difficult to derive with this "parameterization."

As already indicated, these modelers have assumed that the Milankovitch theory has been "proved" by the results of deep-sea cores. Now it is up to them to show how it physically happened. Needless to say, bias, which will be discussed later, is a prime factor behind the impressive results. Imbrie and Imbrie⁶³ have no qualms about forcing the results to the paleoclimatic record: "Tuning a model to the climatic record is an essential feature of our strategy."⁶⁴ Thus they fit their model to the oxygen isotope results of deep-sea cores,⁶⁵ which will be shown to have been matched to the Milankovitch radiation cycles. In fact, Imbrie and Imbrie put the cart before the horse when they say: "... we should use the geological record as a criterion against which to judge the performance of physically motivated models of climate."⁶⁶ In other words, if the model cannot "predict important features of the paleoclimatic record,"⁶⁷ it is a failure.

3) RADIATION SENSITIVE PARAMETERIZATIONS

Several parameterizations in these models are particularly sensitive to the Milankovitch radiation anomalies. One of these is the high latitude snowfall, which is unrealistically high for Northeastern North America, one of the areas of Pleistocene ice sheet initiation and the only one henceforth referred to in this paper. Figure 7 shows the area under consideration. Two centers of ice sheet growth are assumed: Keewatin and the Labrador-Ungava Plateau. Keewatin is the area west and northwest of Hudson Bay, and the Labrador-Ungava Plateau is the area east and southeast of Hudson Bay. The elevation is relatively low with few mountains. Weertman⁶⁸ and Birchfield and others⁶⁹ used a snowfall of 1.2 meters/year to develop an ice sheet.

This is more than three times the yearly snowfall for the Labrador-Ungava area and 10 times that of the much drier Keewatin. In their most recent modification, Birchfield and others used the latitudinal average snowfall.⁷⁰ This has been common practice in recent climate models, but it is still two to three times too high for Northeastern North America.

A second radiation sensitive parameterization is the albedo or reflectivity of snow or ice in these climate simulations. "The manner in which these feedbacks are parameterized can have a large impact on the sensitivity of a climate model."⁷¹ A yearly snow and ice albedo of 0.7 (zero means no reflection and 1 is all solar radiation reflected) is commonly used.^{72,73} This is much too high for ice and melting snow, and even fresh snow in many areas during winter. The albedo of snow drops rapidly down to 0.4 or 0.5 as it begins melting due to the meltwater and the change in snow crystal size. Dust particles in the top layer of snow will drop the albedo substantially more, depending on their concentration.⁷⁴ Aircraft measurements over relatively deep, fresh snow in winter revealed that an albedo of 0.7 or more is characteristic of Northern Keewatin, Northern Labrador-Ungava and northward, but is much too high for areas to the south.⁷⁵ The reason for this is forests with a snow cover have a significantly lower albedo in winter than the tundra or plains. Consequently, an excessively high yearly albedo, coupled with very high snowfall make these models extremely sensitive to decreased summer radiation. Large temperature drops and ice sheets will thus result, and correlate with the Milankovitch radiation minimum, which are initial conditions in these climate simulations. Saurez and Held^{76,77} seem to justify this procedure by asking: "But are not ice ages, in fact, evidence for such exceptional sensitivity?"⁷⁸ The circular reasoning is evident. It should be noted that their model predicts an ice age now with temperatures even colder than at the maximum ice extent of the last ice age.⁷⁹

A third highly sensitive parameterization is an unrealistic vertical shift of the summer freezing level with Milankovitch radiation cycles.⁸⁰⁻⁸² Since the freezing level tilts downward towards the north in the mid and high latitudes, lowering this boundary will cause the snowline to intersect the ground and shift south, allowing an ice sheet to develop to the north. This "very much simplified direct forcing"⁸² method has been used to shift an ice sheet through a range of 17.2° latitude.⁸³ (This model actually assumed an ice sheet as an initial condition with its snow-albedo positive feedback. However, this tells us little about the origin of the ice sheet, a much more difficult problem.) Large north-south shifts in the snow accumulation zone is like moving a locality further north or southward. Zeuner says this procedure "lends itself to misinterpretation, as the *imaginary* displacement of the locality may be taken as something real."⁸⁴ This practice ignores all the variables related to the snowline other than radiation, and the fact that during summer, the higher latitudes actually receive more radiation than the lower latitudes due to the longer days.

4) NEGATIVE RESULTS

Previous to the modern revival of the astronomical theory of the ice ages, climate simulations indicated the Milankovitch mechanism was too small to cause

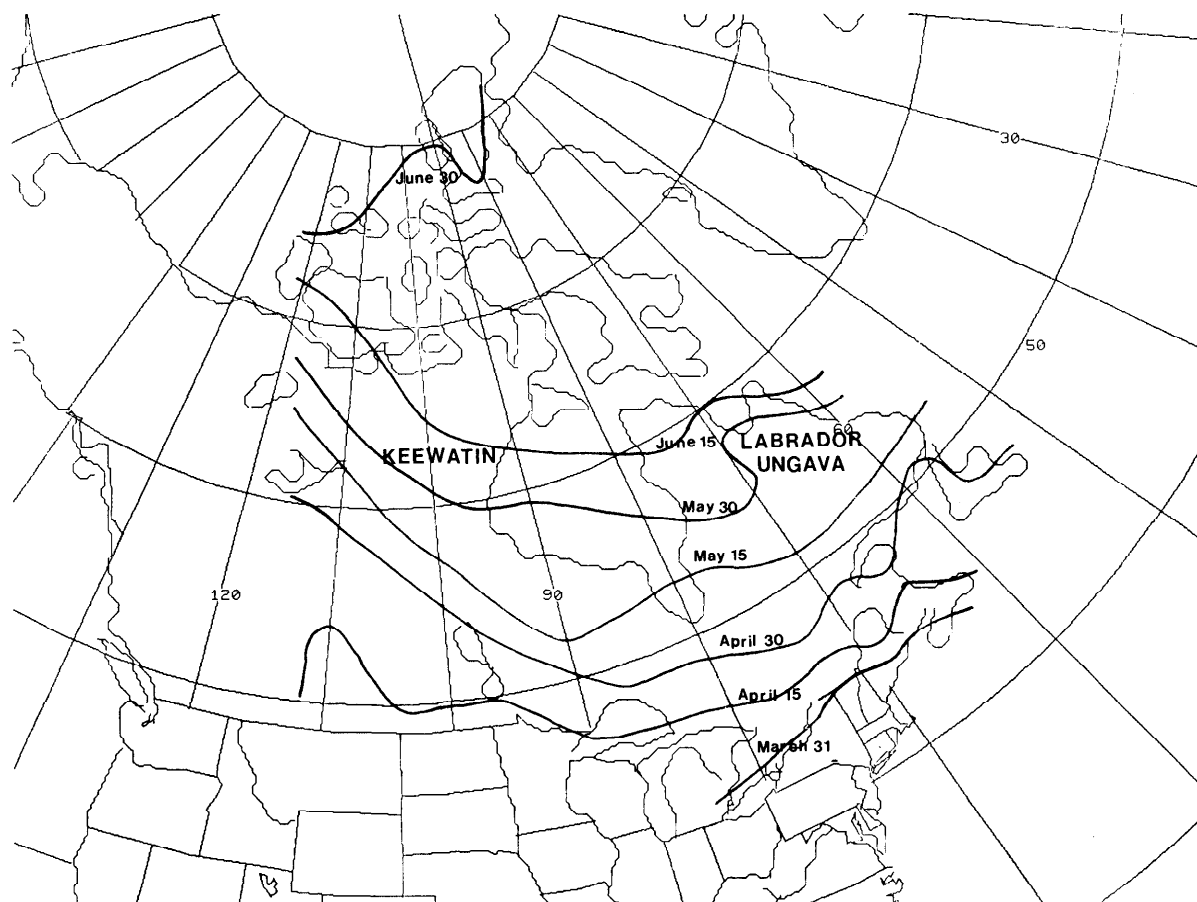


Figure 7. Keewatin and the Labrador-Ungava Plateau and the median date of last snow cover of one inch or more for 20 winters in Eastern Canada. (Redrawn from Potter, 1965)

ice ages.⁸⁵⁻⁸⁸ These models were simple energy-balance models and have been criticized for this. Much of this was justified. However, earlier workers did not feel a need to fit the model to the supposed paleoclimate record, and consequently were more objective. In spite of the recent "positive" results, some sophisticated models have not produced the Milankovitch cycles or ice ages. Coakley used modern parameterizations for present day radiation derived from satellite measurements, although with an unrealistically high albedo of 0.63. He concluded that the earth's climate is hardly affected by the Milankovitch mechanism.⁸⁹ His model was criticized for using annual averages instead of including seasons. In an updated version, of his model, he added the seasonal cycle. North and Coakley conclude:

The distribution of the incident solar radiation in the models is shown to be insensitive to changes in the eccentricity and the longitude of the perihelion and sensitive only to changes in the obliquity of the earth. For past orbital changes, both the seasonal and the mean annual model fail to produce glacial advances of the magnitude that are thought to have occurred.⁹⁰

This result is more consistent with the small radiational changes of the Milankovitch mechanism and the most recent information on conditions needed to produce an ice age.

D) Glaciation of Northeastern North America Very Difficult

1) INTRODUCTION

A 6 °C summer temperature drop from the average with the same precipitation was long considered the threshold for glaciating Northeastern North America.^{91, 92} However, this value was never rigorously tested.⁹³ While the astronomical theory of the ice ages was being "confirmed," research from other quarters showed that starting an ice sheet over Northeastern North America was much more difficult than previously thought.^{94, 95} (Similar difficulties would be encountered for other Pleistocene ice sheets.) As a result of his research, Loewe states: "The origin of the North American ice sheets consequently raises some difficult questions."⁹⁶ This, of course, is within the uniformitarian framework, which includes the astronomical theory.

2) CLIMATOLOGY OF KEEWATIN AND LABRADOR-UNGAVA

Winters in Keewatin and Labrador-Ungava are currently very cold while summers are relatively warm, except for the coastal locations where cool water suppresses the temperature. According to uniformitarian assumptions, Hudson Bay likely was non-existent due to isostatic rebound before "each" ice age.⁹⁷ Hudson Bay exerts a very pronounced regional cooling effect, which means that without it, summers would have

been significantly warmer than today before an ice age. Currently, the average June to September temperature for Keewatin and Labrador-Ungava is about 10°C ,⁹⁸ which is relatively warm. If the average fell to 4°C , an ice sheet would not necessarily develop because other variables come into play, like precipitation, upper-air temperatures or the lapse rate (the change in temperature with height), solar radiation (regardless of small anomalies), and cloudiness. Presently, the April to August snowline is well over 2000 meters for most of the area.⁹⁹ The average lapse rate in the lower 8000 meters of the atmosphere in this region is usually taken to be 6°C per 1000 meters descent. Since the average elevation is about 500 meters,¹⁰⁰ a surface temperature drop of 6°C , due to a radiation minimum and assuming no lapse rate change, would lower the freezing level to about 1200 meters. This is still above the surface, except for the mountains. However, it is more realistic that upper-air temperatures would change less and the freezing level would be significantly higher than where solar radiation is primarily absorbed. The upper air is controlled more by the general circulation of the atmosphere which would tend to resist change.

Precipitation for the two areas is much different. Labrador-Ungava is relatively wet with a yearly average of about 29 inches, half of which is rain. Keewatin is much drier with a yearly average of only six to 10 inches, most of which is rain during the warmer months.¹⁰¹ Consequently, very little snow accumulates by spring and "at present the summer temperatures are so high that the snow easily disappears."¹⁰² Since storms in Northeastern North America are very windy, the precipitation gages do not collect all the rain and snow. The actual snowfall is higher. However, the wind also causes bare or thin spots on exposed areas, where the albedo will be locally lowered in spring, and partially compensate for the low precipitation readings. Regardless of the exact snowfall, it usually melts by June 15, except for the extreme north which is not far behind. Figure 7 shows the average date of the last snow cover of one inch or more for 20 springs in Eastern Canada.¹⁰³ A drop in the average summer temperature of 6°C will cause a larger proportion of the precipitation to fall as snow.¹⁰⁴ However, this could not be excessive because cooler air is drier and would offset the above effect to some degree (Figure 8).¹⁰⁵ With a 6°C drop, Keewatin would be very comparable to present day Northern Siberia, where there are no ice sheets.¹⁰⁶

3) $10\text{--}12^{\circ}\text{C}$ SUMMER COOLING REQUIRED

The implication of the above section is that much more than a 6°C summer temperature drop is needed with the present atmospheric circulation to glaciate Northeastern North America. The amount of change has recently been shown by Williams.¹⁰⁷ He used a computer model for the energy balance over a snow cover to simulate the conditions needed to cause glaciation of Keewatin and Labrador-Ungava. The model had realistic values of albedo under a variety of snow and cloud conditions. It compared favorably to the observed seasonal changes on the Decade Glacier on Baffin Island. To test the strength of the Milankovitch mechanism to initiate glaciation, he used the strong radiation minimum at 116,000 years ago (Figure 6). He began with the presumed 6°C temperature drop, and from there decreased the average by increments

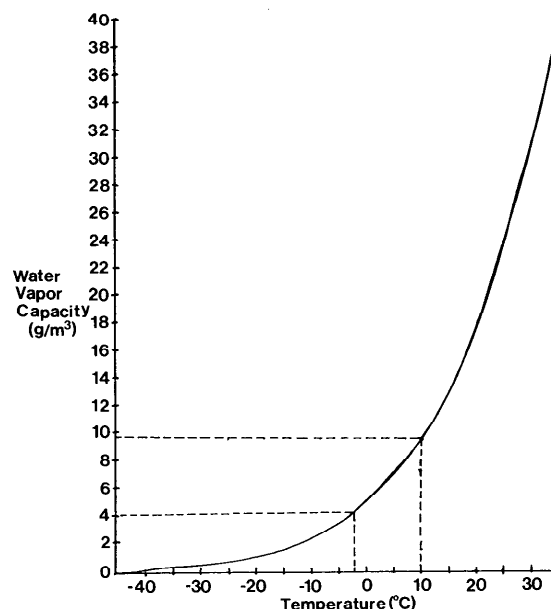


Figure 8. The relationship between the temperature and the water vapor capacity of saturated air.

of 2°C . The amount of precipitation was assumed to be the climatological average in the early experiments, but the proportion falling as snow was allowed to increase with decreasing temperature. The model showed that Baffin Island was the most likely site of ice sheet initiation. However, even with a strong radiation anomaly, it was very difficult for the ice sheet to spread from there, and "much more climatic change is required for extensive glacierization of either Keewatin or Labrador-Ungava than has been suggested, equivalent to a 10 to 12°C summer temperature decrease."¹⁰⁸ (emphasis mine) This conclusion apparently has been accepted by paleoclimatologists, since Birchfield and others, referring to Williams' conclusion, use the above temperature change as a goal to be reached in testing the Milankovitch mechanism.¹⁰⁹ This much cooling is almost impossible for any uniformitarian ice age theory.

4) COOLER AIR IS DRIER

A 6°C or more summer temperature drop in Northeastern North America would be accompanied by cooler than normal spring and fall temperatures. Also, a snow cover would be established quicker in the late summer and early fall, so that autumn temperatures would be chilled further due to the snow-albedo feedback mechanism.¹¹⁰ It is difficult to know whether winter temperatures would be below normal. Since the yearly average temperature would be much below the present day average, the yearly precipitation would be significantly less from this factor alone, for cooler air is drier. Figure 8 shows the direct relationship between temperature and the water vapor capacity of the air.¹¹¹ If the average summer temperature decreased from 10°C to the previous threshold of 4°C , saturated air would hold one-third less moisture. If the average plummeted 12°C (shown by the dashed lines in Figure 8), the air would contain about 60% less water vapor! It is known that cooler than normal summers are also drier.¹¹² Similar arguments can be made for drier conditions in fall and spring, and even if win-

ter temperatures were several degrees warmer, Figure 8 indicates little change in the moisture capacity of the air at such low levels. The relationship between temperature and the moisture content of the air at saturation is perhaps the most difficult problem all ice age theories have to face, and probably accounts for why there are so many.

5) A PROPOSED ATMOSPHERIC CIRCULATION CHANGE

Even a 6 °C summer temperature drop was considered very difficult to attain under uniformitarian conditions. To avoid such a drastic change, not to mention the new problems presented by Williams' research, it has been proposed that a more modest temperature plunge would be enough to cause an atmospheric circulation change. This would bring more moisture into the area to offset the smaller temperature change and force an ice age. Support for this comes from Ruddiman and McIntyre who claim from geological evidence from deep-sea cores that the surface temperature of the North Atlantic was 1 to 2 °C warmer than average for about the first half of ice sheet growth.¹¹³ Above normal sea-surface temperatures would generate more water vapor that would be carried by southerly or easterly winds to a growing ice sheet. A large temperature difference between the warmer ocean and the adjacent ice sheets of North America and Greenland would force the storm track along the coast further aiding ice sheet growth.¹¹⁴ (This is almost the same scenario proposed by this author for a rapid post-flood ice age.^{115,116} However, an adequate summer cooling mechanism, plus much warmer ocean water, would make the author's model much more likely and rapid.)

It is doubtful that a modest summer or yearly cooling could trigger a significantly moister circulation change, or that above normal sea-surface temperatures off the coast could be maintained for very long. First, the drying tendency of cooler air would have to be overcome. In referring to the glaciation of the climatologically moister Labrador-Ungava area, Loewe states:

... it is not easy to see how a substantial rise of total, or a shift to winter, precipitation can be reconciled with the smaller capacity of the cooler air to hold water vapor. It is also doubtful whether a simultaneous change in general circulation would be able to provide the necessary snowfall.¹¹⁷

Second, there are characteristics of the atmosphere that would tend to develop a drier circulation pattern for Northeastern North America caused by cooler temperatures. This is an area of speculation and misinformation. Lamb and Woodruffe estimated 150-300% of normal precipitation for the circulation at the beginning of an ice age,¹¹⁸ based on extreme months in the current climate which came closest to the "assumed" pattern of glacial onset. Barry, Ives and Andrews questioned their use of extreme months, which were actually only 200 percent above normal at the most, and stated: "It is doubtful to what extent an extreme circulation pattern may persist for a full season or even so for a long time interval."¹¹⁹ Below normal temperatures in the present climate in the area of consideration may cause above normal snowfall in the autumn, the season of highest snowfall, but it is difficult to know which is the cause and which is the effect.¹²⁰ In an analysis of the cool year, 1972, Wil-

liams found that precipitation was only 20 percent above normal from September to December, and this was primarily due to the early fall snow.¹²¹ To illustrate the drying potential of the atmosphere caused by a Milankovitch radiation minimum, I will assume that during one of the cooler summers, the snow failed to melt over Keewatin and Labrador-Ungava. This would reinforce the summer cooling by the snow-albedo feedback.¹²² and cause much cooler fall temperatures. This in turn would strengthen the ever-present upper air cold trough (low pressure area):

Because incident solar radiation is mostly reflected from a snow surface, the air above an extensive snow cover is colder, and atmospheric pressure decreases more with altitude in the colder air. This tends to create an upper 'cold trough' above an extensive snow cover . . .¹²³

This would have the tendency to drive the storm track further south and east, and hence act as a retarding influence on the snow accumulation, especially in the northern sections. On the surface, the snow cover and the cooler air would strengthen the dry Arctic high pressure system, especially during the colder months and in the north.¹²⁴ The above changes are seen on a larger scale in the modern climate during the seasonal change. As winter approaches, high latitude cooling drives the storm track further south as the Arctic anticyclone develops. This drying tendency when snow and/or ice would remain over the summer or become established was recognized by Ruddiman and McIntyre:

But the growth of these extensive bodies of ice also implies an expansion of the polar anticyclone normally positioned over ice cover in high latitudes of the Northern Hemisphere. This expansion of dry cold air would reinforce the normal high-Arctic aridity and slow or stop the rapid growth of ice sheets unless opposed by other parts of the climatic system.¹²⁵

The above sequence would have the tendency to cause the presently dry Keewatin to become even drier due to its northerly position and its location in the very dry northwesterly circulation west of the upper trough.¹²⁶ The snow would consequently melt in this region the next summer, if it could last even the one summer. Labrador-Ungava is closer to the moisture source of the North Atlantic Ocean and would be in a better location for glaciation, except that the storm track probably would be further southeast. The postulated above normal sea-surface temperatures are the "other parts of the climatic system"¹²⁷ proposed by Ruddiman and McIntyre which they hope would lift the storm track further northward and provide the necessary increased moisture for glaciation. It is difficult to understand how a small change of 1 to 2 °C warmer sea-surface temperatures could have a significant effect and overcome those factors tending to cause drier conditions. Even though they claim that the Labrador Sea would be ice free,¹²⁸ modern observations indicate this is doubtful and that above normal sea-surface temperatures adjacent to Northeastern North America could not be maintained. Barry and others recognize the need for warmer water, but they add: "... if the recent climatic fluctuation is any guide, we must note that Rodewald reports a 2 °C cooling between 1951-1955 and 1968-1972 in August in the Western North Atlantic . . ."¹²⁹ The cooler water

was likely caused by the below-normal temperatures in Eastern Canada during those years, which were due to a cooler average atmospheric circulation.¹³⁰⁻¹³² In other words, cooler air blowing off the land over the adjacent ocean causes cooler sea-surface temperatures.¹³³ In addition, sea ice in the Davis Strait and the Labrador Sea is much more extensive when it is cooler than average.^{134, 135} Sea ice will reinforce the cooling and drying because of its much higher albedo than water and its barrier to the escape of the ocean's heat and moisture. Barry and others conclude: "This evidence suggests that it may be difficult to sustain high sea-surface temperatures during the initial phase of a glacial period."¹³⁶ Consequently, if a snow cover could survive through a cooler summer, it is likely that the resulting atmospheric circulation change would cause drier conditions or, at best, would not cause a significant increase in snowfall. Thus, the snow cover over Labrador-Ungava would surely melt the next summer. Reviewing research on the cryosphere (snow and ice), including the work of Ruddiman and McIntyre, Washburn says:

... the nature of the climatic changes responsible for the present ice sheets and for the growth and decay of the Pleistocene glaciers are still problematical. The moisture sources and the mechanisms permitting the growth of the Northern Hemisphere ice sheets also remain to be established.¹³⁷

Consequently, a circulation change with less summer cooling than needed will not help glaciare Northeastern North America.

6) INCREASED SNOWFALL NOT HELPFUL

Even if snowfall could be greatly increased with summer cooling, recent research indicates it would not cause an ice age. In a modification of his experiments on a snow cover energy balance model, Williams substituted the maximum observed March 31 snow accumulation in Northeastern North America for the yearly average. Even with a summer cooling of 12 °C, the snow still melted over the summer during a strong Milankovitch radiation minimum. He even tried to elevate the land to account for possible isostatic adjustment to ice sheet unloading. He concludes: "... increased winter snow accumulation (the maximum observed at each station) does not greatly increase the area of perennial snow cover, nor does the possible effect of unrecovered glacioisostatic rebound..."¹³⁸ In other words, increased precipitation does not help initiate an ice sheet and certainly will not offset a lack of cooling, no matter what the circulation change that results from cooler summers. This result makes it practically impossible for a uniformitarian ice age to have occurred.

The reason for this somewhat surprising result is the efficiency of the melting process.¹³⁹ Snow melt equations in the past depended mainly on the temperature, and the direct effects of solar radiation were poorly parameterized. It is now known that "radiation is the dominant component of the surface energy balance over snow during the melting season."¹⁴⁰ Since the mid and high latitudes receive as much or more radiation than the tropics in the summer, solar radiation is a powerful influence in Northeastern North America during the melt season. This is even more efficient as the snow becomes dustier.¹⁴¹ Increased cloudiness in summer would not appreciably change the results. Decreased solar radiation in this case would be offset

to a large degree by increased infrared radiation from the clouds to the snow. The net heating or cooling effect of long term changes in cloudiness is not really known and currently is much debated.¹⁴² Besides, summers are presently very cloudy in the region, particularly in Labrador-Ungava.¹⁴³

III) SUMMARY

The three orbital variations in the astronomical theory of the ice ages were examined. It was shown that the changes in radiation are too small. Even though some modern climate simulations have indicated these small changes can cause ice ages, a closer look revealed that the results were forced by preconceived ideas and based on poor radiation-sensitive parameterizations. Other climate simulations have produced negative results. While the Milankovitch theory was being revived in the 1970's, research on the needed conditions for glaciation of Northeastern North America indicated much more climate change was required than previously thought. Even a 12 °C summer cooling is not enough, mainly because cooler air is drier and the resulting atmospheric circulation change would tend to either dry the air further or else cause little change. Even the unlikely possibility of much more snow does not appreciably change the conclusions because summer sunshine in mid and high latitudes is very efficient at melting snow. Consequently, it is very difficult, if not impossible, for a uniformitarian ice age to occur over Northeastern North America. The problem is compounded greatly when it is realized that as many as 30 ice sheets are believed to have developed and melted in regular succession during the Late Pliocene and Pleistocene.¹⁴⁴ Clearly, a non-uniformitarian mechanism is needed for an ice age.

The basis for the renewed interest in the astronomical theory of the ice ages, mainly statistical correlations with oxygen isotope fluctuations in deep-sea cores will be discussed in subsequent articles. Despite many assumptions, unknown variables and problems, the oxygen isotope results are made to fit the astronomical theory. How this is accomplished will be shown in detail.

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HUTTONIAN BIOLOGY AND GEOLOGIC UPHEAVAL

JAY L. HALL*

Received 17 August 1983; Revised 2 January 1984

Abstract

James Hutton's views of essentialist biology lead to the necessity of a singular epoch of rapid geologic activity.

Introduction

The central theme of James Hutton's *Theory of the Earth* is that the terrestrial surface is constantly being eroded into the sea from which solidified sediments are uplifted to form new land. This continual process of "reproduction" not only affects the mineral constituents of the world, but also produces soil suitable for land plants which provide nourishment for an extensive variety of animals. As Hutton noted:

The formation of the present earth necessarily involves the destruction of continents in the ancient world . . . we clearly see the origin of that land, by the fertility of which, we, and all the animated bodies of the sea, are fed.¹

Hutton views the global actions of dissolution and renovation as integral factors in the generation of fertile soil which enables our planet to "maintain and perpetuate" a system of flora and fauna.² According to Hutton, diverse biota have sustained a distinct existence with respect to the earth throughout geologic history. In like manner, he affirms the individuality of *terra* by rejecting Buffon's proposal concerning the solar origin of the earth.³ Buffon suggested that an accidental collision of the sun with a comet was the mechanism which formed the planets.

Hutton's attitude of discontinuous essentialism considers the sun, the earth and numerous classes of life to be discrete entities of nature. Although he argued against the transformation of one basic organizational structure into another, his synthesis was not entirely static. In his unpublished *Principles of Agriculture*, Hutton describes the diversification of "varieties" within "species":

. . . let us suppose only one form originally in a species; and that there had been established in the constitution of the animal, a general law or rule of seminal variation, by which the form of the animal should constantly be changing, more or less, by the influence of different circumstances or in different situations; and we should in this see a beautiful contrivance for preserving the perfection of the animal form, in the variety of the species.⁴

Strikingly unique individuals may arise within a "species" yet among these the essential adaptive features are *preserved*. This anti-evolutionary stance denies the premise that there are no natural constraints on heritable variation. Manier points out that it was impossible for Darwin to demonstrate that the postulate of unlimited variation "either followed from or was compatible with some well-established law of nature."⁵ The basically minor modifications observed through artificial and natural selection suggest that distinct bio-

*Jay L. Hall, a student majoring in mathematics at the University of Oklahoma, receives his mail at 619 W. Boyd, Norman OK 73069.

logical categories may have persisted for the length of geologic time while remaining essentially the same.

Paleobiology

In Hutton's framework of paleobiology, "The animals of the former world must have been sustained during indefinite successions of ages."⁶ He contended that fossil taxa are no different than the present array of life.⁷ With the exception of extinction, paleontological research is consistent with the principle of biological stability. The orderly succession of prehistoric life through the geological eras has been interpreted to show how unique assemblages of life forms were distinct in various periods. C. W. Harper states that:

Fossil taxa often occur in a regular vertical order in strata, yet, this regularity does not necessarily imply that the taxa succeeded one another in the same order in time⁸

If mammals are not found in the early Cambrian, this does not irrefutably document the presumption that the first trilobite appeared before the first mammal. The absence of a particular fossil taxon does not require its nonexistence for a certain epoch. For instance, the fossil record of coelacanth fishes does not extend past the Mesozoic; however, this group continues to survive in the form of *Latimeria* (a genus of coelacanths).⁹ Even though paleontological succession reveals a general trend toward more complex organisms in younger strata, such a pattern fails to conclusively validate a common ancestry for all plants and animals. As Kitts affirms:

Darwinian paleontologists cannot take much comfort from the fact that the fossil record does not compel them to reject their theory because it does not compel them to accept it either.¹⁰

One possible evidence against Huttonian biology is the fact that definite classes of biological diversity mark the distinctions between the Paleozoic, Mesozoic and Cenozoic eras. If basic types of organisms exhibit relative constancy, this alternative to evolutionism must account for the sequential nature of the paleontological record. Anti-evolutionist G. H. Harper suggests that the assemblages of biota which characterize paleobiological periods of the standard geologic time scale occupied a large proportion of local populations where fossilization occurred.¹¹ A crucial problem for such a scenario is the usual rule that relatively simpler fossils are found in older strata. It is hard to imagine how G. H. Harper's idea can predict the order seen in the first appearances of primary adaptive groups, from fish to amphibians to reptiles to mammals. In addition, it is reasonable to assume that the statistical rates of fossilization for "advanced" and "primitive" phyla would be very nearly equal through the geologic ages. It seems unlikely that G. H. Harper's proposal can accurately describe the observed order of succession.

Rapid Geologic Activity

An opposing view of paleobiology regards the major portion of the ecosystems represented since the early Cambrian "explosion" as occurring within a single period of earth's history. This conjecture requires a swift formation of most fossil bearing strata. Postulating that the majority of fossil taxa were part of a singular epoch of rapid geologic activity (SERGA) is in direct agreement with the Huttonian concept that morphologically "simple" and "complex" individuals

have existed together through the duration of geologic time.¹² It seems likely that the vast time spans supposed by orthodox paleontologists to separate trilobites and whales did not exist if these organisms lived concurrently. It is difficult to determine what possible mechanisms associated with a SERGA might account for paleontological succession; however, the proposition of a SERGA appears to be the most sensible framework which follows from the assumption of essentialist biology.

Another potential way of correlating the fossil record with Huttonian biology is to consider multiple epochs of major geologic upheaval. If there were many epochs of rapid deposition, then whatever paleontological pattern of succession might be preserved would repeat itself. Since the paleobiological data indicate just one general order of life forms, it seems that the SERGA concept is the most logical conclusion which follows from the premise that essential types of life have remained basically the same throughout earth's history. Otherwise, the rock record would reveal many instances of a recurring fossil order corresponding in each case to a period of rapid geologic action. Furthermore, several lines of evidence show the plausibility of a SERGA.

High magnitude geologic events have a greater chance of preservation in the rock record than those with normal rates of deposition. Unconsolidated sediment deposited during periods of slow activity may be removed by an unusual episode of erosion. Hutton said that some geologists have:

... supposed certain occasions in which the consequence of those natural operations have been extremely violent, in order to explain to themselves appearances which they know not how to reconcile with the ordinary effects of those destructive causes.¹³

Tremendous incidents of geologic upheaval on a global scale are apparently rare; nevertheless, such occurrences have a great likelihood of being preserved in the stratigraphic record.

Exceptions to the basic order of fossils would be expected in the course of a SERGA. One example is in the Alay Range of the Soviet Union in which Silurian rocks overlies middle Carboniferous carbonate deposits.¹⁴ The standard account of this anomalous relationship of "older" strata upon "younger" rock involves thrust faulting along with enormous horizontal displacement of geologic structures. Rezvoy remarks that, "... the thrust planes, where they can actually be observed, show no trace of large displacements along them."¹⁵ Furthermore, Rezvoy claims that the existence of a thrust plane "... can be inferred only from the change in the fauna collected both above and below it."¹⁶ In other words, the primary reason for considering these strata as "reversed" is the fossils rather than the structural data.

Adopting the concept of a SERGA implies a condensed chronology of much of the geologic column. Studies concerning isotope ratios in coalified wood indicate that the periods of historical geology may be 10,000 times shorter than the commonly accepted ages.¹⁷ Compressing the virtual sum of fossiliferous strata into a comparatively small time interval requires rapid processes. An illustration of such activity is found in Germany's Geiseltal lignite which contains

preserved insect colors and chlorophyll that necessitate very quick fossilization.¹⁸

Summary

Although most of today's geologists accept evolutionary theory, James Hutton the "father of modern geology" held to the view that the basic forms of life have persisted relatively unchanged during the span of geologic time. This anti-Darwinian perspective carries significant implications regarding the nature of historical geology. After considering several alternatives it is concluded that the most consistent position with Huttonian biology is to view the majority of the geologic record as the result of a relatively short period of geologic upheaval.

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PANORAMA OF SCIENCE

Vitalism: A Neglected Weapon?

The question, vitalism versus mechanism, was debated often in the past by those who studied nature. Of late, little has been heard of the matter since secular biologists, with very few exceptions hold the mechanical view. It might be expected that it is difficult to get any argument for the vitalistic position into the literature.

The mechanistic position is that all of the features of living things are due to the interactions of the molecules of which the living thing is composed (the same interactions we study in chemistry or physics). A vitalist, on the other hand believes that there must be something else — call it a spark of life, or something of that sort.

It is sometimes said that vitalism is disproved by the fact that many of the chemical products of living things can be produced in the laboratory, *in vitro*. But surely that argument is fallacious. Some of the same reactions which occur in a blast furnace might happen in a volcano. But nobody doubts intelligence and planning are involved at the steel producer—things which would never be found in a thousand Mount St. Helens.

One of the several good arguments that can be given for vitalism concerns the development of living things from single cell to adult. The common view now ascribes the development to the code contained in the DNA in the first cell. No one doubts that it is part of the answer and the discovery of DNA was a great one, helping to show how complex living things really are. But can anyone explain, for instance, how a certain sequence of molecules causes the spots on a peacock's tail? To say "By enzymes" is merely to imitate the old lady who said that machinery works "with screws, somehow." And the matter is much more difficult concerning instincts, which nobody doubts to be inherited in some cases. I know of at least one creation-

ist who seems to hold a similar view: that DNA is inadequate to explain these things.^{1, 2}

Another argument considers the nature of the mind. Some have said that thought is merely an arrangement or action of cells or parts in the brain. But surely such theory is incredible. How could an abstract universal idea or feeling, such as love, be a material arrangement? No, there must be something which is non-material.³ If there is this non-material aspect (to use a rather indefinite word) in us all of our lives, is it not likely that it was present from the beginning? And if so, is it not likely that it contributed to our development?

I may be asked, what has this to do with creationism? Consider that if vitalism is true, the chance development of life from chemicals floating around somewhere is impossible. For nobody has proposed that the alleged primeval soup contained this vital factor (we call spirit) brought about by strokes of lightning, or something of the sort. If vitalism is true, the original life would have required some intervention; it must have been created.

Then, of course, one can continue. If some life, at least, required an intervention, a creation, we are entitled to wield Ockham's razor, and to accept creation as the reason for the diversity of life, as well as its origin.

It is suggested, then that creationists may find renewed study of this subject very worthwhile.

Contributed by H. L. Armstrong

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THE LEGACY OF DUYVENE DE WIT FOR CREATIONIST BIOLOGY: PART I — THE MAN AND HIS LIFE

MAGNUS VERBRUGGE*

Received 15 August 1983, Revised 28 February 1984

Abstract

This is part one of a three-part series of articles on the life and work of J. J. Duyvene De Wit, a Dutch biologist, who ascribed to the Creation viewpoint and actively worked against the falsity of evolutionary concepts.

A Man to Remember

Dr. J. J. Duyvene De Wit, professor of biology at the University of Orange Free State in South Africa, was an untiring creationist whose major ambition in life was to rally the forces of Christianity to do battle against evolutionism on all fronts.

In his inaugural address when a professor of physiology in Amsterdam he emphasized that if a scientist who is a Christian will avoid *unscientific speculations* derived from non-Christian philosophies, he can avoid many of the conflicts that are said to exist between science and faith. In contrast, the humanist forever gets embarrassing controversies, because he must and does indulge in such speculations. As a biologist he came to this conclusion after an intensive study of the philosophy of nature, developed by Dr. Herman Dooyeweerd.

During the last two years of his life De Wit struck up an intensive correspondence with Dr. George Howe. His purpose was to bring together representatives of the Creation Research Society and those members of the new Christian philosophy of Herman Dooyeweerd who had not embraced evolutionism. Alas, his sudden death in 1965 put an end to this project. His article "The Impact of Herman Dooyeweerd's Christian Philosophy upon Present Day Biological Thought" was published posthumously in 1965 as one chapter in the book *Philosophy and Christianity*. This book contained 29 essays dedicated to Dooyeweerd, upon his retirement from teaching philosophy of law and other courses at the Free University of Amsterdam.

Today evolutionists are still winning major propaganda victories in the battle between creationists and transformists. We sometimes tend to despair and wonder whether we are fighting the good fight in a way worthy of God's blessing. For that reason it may be an inspiration for us to have a closer look at the work of this courageous fighter for creationism and to try and find answers to questions such as these: What motivated him? How successful were his methods? Can his example inspire us to adopt his aim and methods? Where do we go from here? And what is his legacy? Who was this man De Wit?

Dr. Howe sent me his correspondence with these questions in mind. In what follows I will try to find some of the answers, since they could prove to be instructive to us today.

Professional Career

J. J. Duyvene De Wit was born in Holland on March 5, 1909. He studied biology in Utrecht and received

his M.Sc. in 1933. From 1933 to 1946 De Wit was head of the scientific department of a pharmaceutical company. In his spare time he continued his research with the species of Bitterling, a small fresh water fish.

In 1939 he earned his Ph.D. "cum laude" with as topic for his thesis: *The Sexual-endocrine Organization of Rhodeus Amarus Bloch and the Significance of the Ovipositor Test for Endocrinology in General*.

From 1946 to 1950 he served as head of the Institute for Animal Production under the auspices of the Central Organization for Applied Scientific Research of The Netherlands. He continued his research on the Bitterling at the University of Utrecht.

In 1950 and 1951 De Wit served as Professor of Physiology at the Free University in Amsterdam and remained scientific advisor to the Institute for Animal Production. From 1951 to 1964 he was Professor of Zoology, University of the Orange Free State, South Africa.

During these years he devoted himself not only to scientific work but also to the battle against evolutionism. This latter activity eventually cost him his standing within his profession. He had begun a research project pertaining to various representatives of the fish of the Acheilognathinae group, commonly called Bitterlings, but funding for this effort was suspended. Next he was put on half pay, his teaching activities were curtailed and he was offered a small position as researcher.

When he first contacted Dr. Howe in 1963, he had heard of the latter's interest in the battle against transformism and inquired about a possible teaching position in the United States. He badly wanted a more congenial environment in which to labor.

On July 25, 1965, just a few months after the untimely passing of his 19 year old son, Dr. De Wit died while on vacation in Italy.

Professional Correspondence

In a letter of October 24, 1963¹ De Wit referred to Howe's paper: "Miracles and the Study of Creation," by stating that he had requested that "lines of descent between primates and man" be removed from displays at the Transvaal Museum.

He complained that the overwhelming majority of Christian biologists are transformists who see evolution as the way God created man. As a consequence they hold that "an animal heritage in man is present, accounting for his moral deficiency, and replacing sin in its true Scriptural meaning." "The fight against this is a heavy one."

In December 1963² De Wit announced the publication of an article on Teilhard de Chardin³ in *Creative Minds in Modern Theology* and also in *Philosophia Reformata*,⁴ a journal of Christian philosophy, of which Dr. Herman Dooyeweerd was editor.

*Magnus Verbrugge, M.D., F.R.C.S. (Canada), a urologist (retired), receives his mail at Herman Dooyeweerd Foundation, 1915 Bahia Way, La Jolla, CA 92037.

In a letter of February 1964⁵ he mentioned that he had sent two treatises telling how difficult it is to find scientific substantiation for evolutionism to some 25 "top biologists," including Dobzhansky, Grobstein, Julian Huxley, E. Mayr, H. J. Muller, B. Rensch, Overhage, Portman, A. Remane, Stich, Stebbings, G. G. Simpson, Waddington, and others for comments.

In March 1964⁶ he discussed some of the replies from the biologists to whom he had sent his treatises.

H. J. Muller of Indiana University refused to go over his objections to transformation point by point. The reason: he thoroughly disagreed with them!

Sir Julian Huxley was astonished that De Wit's bias could bring him to ignore the evidence for evolution as presented by man's embryonic gills and tail. And how could he question the validity of the general theory of gradual evolution by natural selection after he, Huxley, as well as Dobzhansky, Rensch and Mayr had written whole books showing its validity!

Dobzhansky wrote that he was a Christian and was sorrowful and ashamed by De Wit's attitude. He felt that such writings would be welcomed by all militant atheists because they displayed obscurantism, blindness and were reactionary in character.

G. G. Simpson expressed his shock that a professor in the Department of Zoology in what is "supposed to be a university" would write such a treatise. He had even thought that this university was located in a civilized country! He considered De Wit to do a great disservice to Christianity and religion. He refused to address himself to the arguments since he disagreed with De Wit.

Rensch referred De Wit to his books for his opinion on the questions raised. He objected to the "mixing of science and religion." Religion developed slowly and not always in correspondence with the facts, whose investigation is the task of science. But now fortunately many Catholic and Protestant theologians have begun to coordinate scientific facts and religious interpretations. These men now believe that all organisms arose through a slow process of development through natural forces, all the way to man. He hoped that these theologians would convince all Christians now of the scientific merits of evolution.

It is interesting for us to see how some famous scientists descended to the level of the ancient sophists by attacking their opponent "ad hominem" instead of with rational arguments. These sophists pointed at some regrettable feature in their opponents' character, be it a lack of intelligence (he is a fool) or a lack of morals (he is a crook).

On Christian Philosophy

In April 1964⁷ De Wit agreed with Howe's statement that "as soon as the light of God's Word penetrates apostate deliberations (religious, philosophical and scientific . . .) then, by inner necessity, it reveals itself as prophetic."

Concerning opposition that such activity might bring from committed evolutionists, De Wit wrote: "If our work does not *evoke* anti-Christian reactions of all sorts, we may question ourselves whether we are moving on the right track!" He posed an open question for evolutionists as follows:

What have you, so-called non-conservative and scientifically 'enlightened' people *contributed* to the spiritual unfolding and deployment of our world during the last century? What securities,

standards, norms, etc. have you developed which transcend, or even equal those which developed already in our Western culture as the result of Christianity taken in its true sense? Nothing but three wars, two of which were world wars.

In a June 16, 1964⁸ letter De Wit spoke of Christians who refuse to take a stand. He expressed the hope that some prominent biologists would soon come to the fore who would join him in the task of attacking Darwinism on the scientific *as well as the philosophical* level.

My greatest concern at present is the increasing sympathy of certain kinds of Christians with secularized science and philosophies for ecumenical reasons. As a result the true children of God become more embarrassed by them than by their non-Christian neighbors.

On July 24, 1964⁹ De Wit mentioned the fact that Christians live side by side but apart from each other because of denominational barriers. And yet, so many are agreed on this central issue: they believe God's record of creation and reject man's transformist speculations. He expressed his desire to work for bringing all scientists who are creationists together in spite of their different backgrounds.

In a letter of August 12, 1964¹⁰ De Wit further elaborated on the means by which he felt that this ideal could be realized. He recognized that *the major obstacle is the prevailing lack of insight into the philosophical aspects of biology as a science*. Because of this lack, Christian biologists miss a great weapon in their fight against the transformists. He argued as follows:

The question at issue, which in my opinion is of essential importance to the further policy of the CRS, can only be treated from the standpoint of Christian philosophy . . . This philosophy is however not known among creationists and I think it absolutely necessary that they become intrinsically acquainted with it.¹¹

He urged George Howe and John Moore to attend a conference, to be held on the philosophy of science at Unionville in Canada that summer.¹² Dr. Moore went and wrote a report on his experience, which was reprinted in the October 27, 1964 issue of *Calvinist Contact*, a Christian weekly in Canada.¹³ The reason Moore went, he wrote, was his reading of some "tremendously important" articles by Duyvene De Wit. He found it to be "most fulfilling to my mind and spirit." Studying the Christian philosophy of Herman Dooyeweerd through reading *In the Twilight of Western Thought*¹⁴ and seeing it applied at the Unionville conference was for him "a wonderful experience." He urged other Christian scholars to investigate this law-philosophy of Dooyeweerd, because he saw the answer there to the traditional theistic evolutionary thoughts of so many Christian scholars. De Wit¹⁵ asked that Dr. Howe have Dr. Moore write in the *Creation Research Society Quarterly* about the conference in these words: "Both circles of Christians (i.e. *scientists and philosophers* M.V.) **MUST** come to intrinsic cooperation and understanding."

He also mentioned that his articles on Teilhard de Chardin and on transformism would be published in *Philosophia Reformata*,¹⁶ edited by Dr. Herman Dooyeweerd, with a foreword by Dr. Mekkes, Professor of philosophy in Holland. Thus De Wit's anti-evolu-

tionist ideas had found a good reception among reformed philosophers in the school of Dooyeweerd.

De Wit¹⁷ wrote that he had sent a request to the U.S. National Science Foundation (NSF) for a grant for research on the problem of how a species originates and what it really is. For elucidation of these questions he proposed to do research on the commensalism between his favorite fish, the Bitterling, and the Mussel. He stated that a side issue to be investigated was the problem of genetic pauperization. In the accompanying bibliography he listed 79 publications by him on related subjects, some of them in co-authorship with others. De Wit felt that his work would help to put his anti-transformist position on a more scientific basis.

A request to withdraw this grant application was mentioned in correspondence of December 14, 1964.¹⁸ De Wit received a letter from NSF asking him to withdraw his application for a research grant. The reasons were rather technical, but he was told that if he had been an American, he would have stood a good chance:

... likely you would have been on the other side of the wire. Your credentials are excellent and the work you are doing is important. It should be quite a feather in the cap of the University of the Orange Free State to have a scholar of your status on campus.

On February 1, 1965¹⁹ he informed Dr. Howe of the rejection of his application. He had also had further grants for continuing his research in South Africa denied. Indeed, his transformist colleagues were trying to remove him because of his anti-evolutionary position. De Wit also mentioned that Dr. Riemer of NSF wrote that he would gladly support De Wit's application for a grant from the South African authorities because of the scientific merits of the work as recognized by the 13 American scientists who reviewed his application.

On May 17, 1965²⁰ De Wit reported that the booklet on his critique of transformism had been favorably received by several scholars in philosophy and theology at the Universities of Potchefstroom, Stellenbosch and Bloemfontein. He ended his letter with:

Although you will be extremely busy, of course, during the period ahead, I hope that you will find time to write me off and on about our common work and task against evolutionism.

Soon after this final letter, Dr. J. J. Duyvene De Wit, dedicated fighter against evolutionism, suddenly died. All we have today is the writings he left behind. In the next paper we shall examine the fruits of his labor.

Readers who are interested to learn more about the amazing Cosmonomic view that inspired Dr. De Wit and others to abandon evolution as a "scientific" approach to the question of origins, may well wish to investigate the following papers and books:

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QUOTE

Charles Steinmetz, the visionary electrical engineer, said in 1930, of all things:

I think the greatest discovery will be made along spiritual lines. Here is a force which history clearly teaches has been the greatest power in the development of men and history. Yet we have merely been playing with it and have never seriously studied it as we have the physical forces. Some day people will learn that material things do not bring happiness, and are of little use in making men and women creative and powerful. Then the scientists of the world will turn their laboratories over to the study of God and prayer, and the spiritual forces that have hardly been scratched.

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ASTEROIDAL IMPACTS AND THE FLOOD-JUDGMENT

DAVID W. UNFRED*

Received 1 November 1983; Revised 30 January 1984

Abstract

Scientists developing Earth models within the framework of the global Flood-Judgment should consider a role for asteroidal impacts. There is evidence that the Earth, indeed the Solar System, was exposed to massive encounters with meteorites, asteroids and comets. This article surveys some of the evidence and possible consequences.

Evidence of Asteroidal Impacts

Earth-orbiting satellites have contributed to the identification of previously unrecognized impact features on the Earth's surface.¹ Exploration of the Moon and planets has challenged scientific opinion about the magnitude and significance of asteroidal impacts. Even so, very few geodynamic models consider a role for asteroidal impacts. Until 1950 only twelve geological structures were identified as meteorite impact craters. Today, increased interest in these structures has enlarged the list to 110. Not only the number of identified impact craters has grown, but also the range in the size of craters has increased: For example, the Ishim impact crater in Kazakhstan has a diameter estimated from 350 to 720 km; the Reitz in South Africa is 350 to 500 km diameter. Both impact craters are at the large end of the scale. At the smaller end is Australia's Boxhole crater with a diameter of 0.17 km.²

Opinions are also changing concerning the frequency of encounters between Earth and asteroidal bodies. Meteorites, asteroids, planetesimals and comets are known to exist in orbits about the Sun. Some 40 asteroidal bodies are known to cross Earth's orbital path. Earth orbit-crossing asteroids are called Apollos after the name given to the first identified orbit-crossing asteroid. Some astronomers estimate the number of Apollos may be closer to a thousand.³ In addition to material orbiting within the Solar System, the Solar System is also in orbit within the Milky Way Galaxy. Encounters with bodies outside the Solar System are therefore possible. Radioastronomers have observed large, dense (dark) clouds in space. One theory recently put forward is that these clouds may contain comets. It is estimated that the enormity of a cloud is sufficient to hide as many as 100 thousand million comets.⁴ Current belief is that comets are conglomerates of ice and rock debris—a "dirty snowball."⁵ It has also been suggested that some asteroids and meteorites may actually be fragments of larger comets.⁶ Clube and Napier of the Royal Observatory in Edinburgh believe that when the Solar System passes through or near one of these clouds, the Sun's gravity dominates and a portion of the cloud is captured. Such captures would flood the planetary region with asteroidal material which could lead to a catastrophic bombardment of Earth, Moon and the planets. Because these speculations are set against the backdrop of evolution-biased time, they are postulated to recur at intervals of hundreds of thousands of years.⁷

Another view, based on a Bible chronology, is that the Earth has encountered at least one swarm of large asteroidal impacts in the past. One such event was the Flood-Judgment of Scripture.

Solar System

Evidence of massive and numerous encounters with asteroidal bodies in the Solar System is seen in surface features of the planets and their moons.⁸ The circular Caloris Basin of Mercury is 1300 km in diameter and is ringed by mountains. This basin is thought to be the result of a large asteroid hitting the planet.⁹ Voyager 2 photographed a 400 km diameter crater on Tethys (a moon of Saturn) which is only 1050 km in diameter.¹⁰

Remnants of a Flood-Judgment asteroidal swarm may still be identifiable in the Solar System. Phobos, a moon of Mars, and Amalthea, a moon of Jupiter, are examples of asteroid-like bodies captured in planetary orbit. Phobos has a diameter of 20 km and Amalthea is a rock 155 km by 270 km.^{11, 12} Ceres is an asteroid 1000 km in diameter. Ceres is part of the giant asteroid belt between Mars and Jupiter.¹³ It had long been thought that this asteroid belt was the remnant of an exploded planet, but this view has changed.¹⁴ It is now thought that this orbital position about the sun is stable, holding captive asteroids between the gravitational pull of the Sun and Jupiter.

In addition to numerous impact features, Mars gives witness to other catastrophic events. The Chryse plain of Mars shows evidence of flash flooding. Water cannot be detected in this region today, but at one time in the planet's history, water may have obliterated all surface features except the highest rimmed craters (Figure 1). It is possible that asteroidal impacts at the polar ice cap may have resulted in melting and subsequent flooding of the Chryse plain.¹⁵ Another possi-



Figure 1. The Chryse plain of Mars shows features of possible ancient flash flooding in areas where surface water is not detectable today. Only the highest meteorite crater rims avoided the possible on-rushing flood waters. (Kaufmann, 1979, p. 126: drawn from NASA photograph.)

*David W. Unfred, M.S., is Director of External Studies, Christian Heritage College, 2100 Greenfield Drive, El Cajon, CA 92021.

bility is that Martian polar ice and the Chryse flash-flooding features resulted from extraplanetary ice at the same time as Earth's Flood-Judgment.

The Moon

Closer to the Earth, the Moon bears visual testimony to numerous possible asteroidal impacts. Earth-based telescopes can count over 30,000 impact features greater than one kilometer in diameter (Figure 2). The largest impact-features, the maria, are believed caused by large impacts that broke through the Moon's surface allowing molten lava to flow over large areas.¹⁶

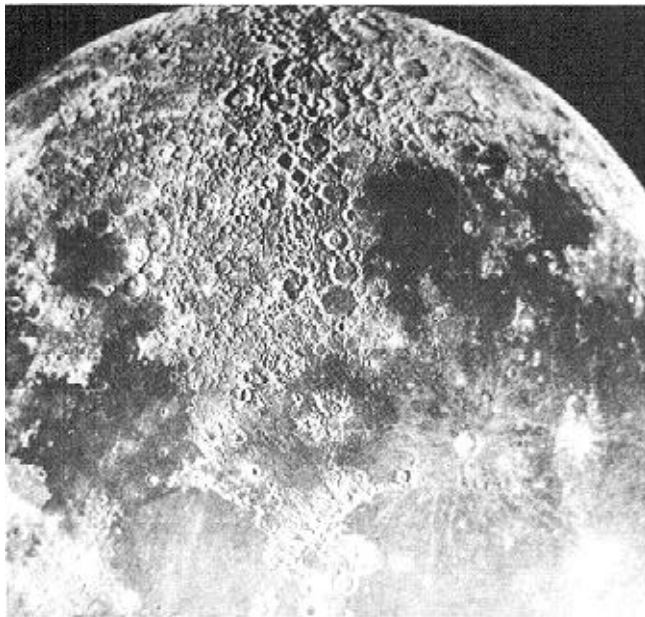


Figure 2. The surface of the Moon testifies to possible massive bombardment by asteroidal material in the geologic past.

The Earth

Large impact craters are identifiable on the Earth's surface. However, the number of terranean impact structures is less than expected. Shoemaker, et al., has estimated the cratering rate from earth-crossing asteroids as approximately twice the observed rate.¹⁷ This calculated rate is based on evolution-biased time. Dachille calculated asteroidal impacts based on the observed number of lunar maria. Proportionately there should be 400 to 500 such impact scars on Earth. The largest Earth impact craters can be compared to lunar maria and would be in the class of the Marc Oriente (900 km in diameter) shown in Figure 3.¹⁸ Figure 4 represents the relative diameters of this class of large spheroids to the Earth's diameter. Small meteorites frequently burn on entering the Earth's atmosphere whereas large maria-producing asteroids and large comets would not. It has been suggested that large asteroid impacts have weakened the Earth's crust. For example, the 720 km Ishim Meteorite crater in the Teniz basin of central Kazakhstan dominates the Asian orogenic as observed from surface topographical maps.¹⁹ Still the number of large impact structures falls considerably short of the predicted 400 to 500. Why is this so? Why would the smaller Moon, which was created after the Earth, show greater asteroidal impact damage than Earth? The relatively small number of large asteroidal impact features on the Earth's surface could be indirect evidence of the Flood. For

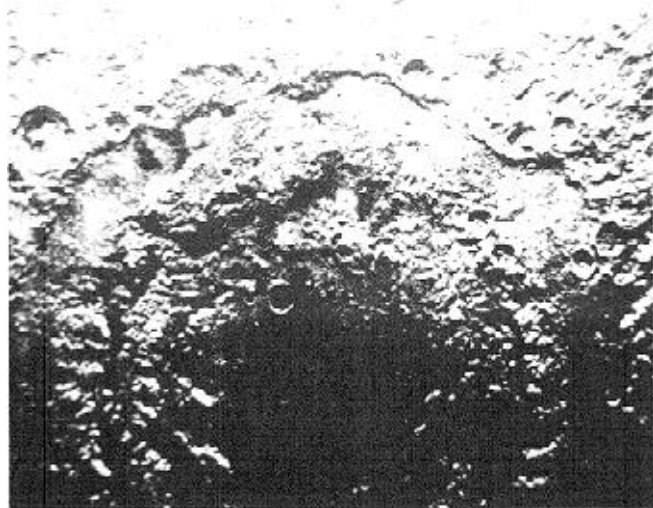


Figure 3. The diameter of the outer mountain ring of Mare Oriente is 900 km. (NASA Orbiter photograph IV-M-187.)

example, the global Flood waters destroyed early large impact features or modern continental features were exposed after the initial impacting swarm or both.

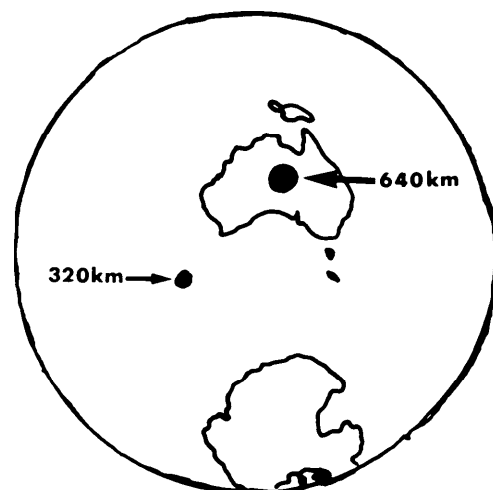


Figure 4. Relative diameters of "large" spheroids to the diameter of Earth.

Iridium Anomaly

In addition to impact features, potential evidence for asteroidal impacts during the Flood Judgment has come from the discovery of noble metals in sediments. Studies have shown that noble metals²⁰ often occur unfractionated from each other in samples of meteorites.²¹ In 1979 an unusually high enrichment of noble metals, including iridium, was discovered in a sediment layer. According to evolution-biased geologic time, the sediment layer represented the boundary between the Cretaceous-Tertiary periods.²² Eocene-Oligocene boundary sediments have also been found to have an enriched iridium layer.³² The iridium anomaly has been discovered in sediments from Italy, Spain, Denmark, United States (Raton Basin) and New Zealand, as well as in ocean floor sediment cores from the Pacific and Atlantic.^{24,25} The wide-spread occurrence of the anomaly is cited as evidence for an asteroidal impact which was of sufficient size to have caused the extinction of plant and animal species pre-

served in the associated sediments.²⁶ These sediments are widely held by Creationists to have been deposited toward the end of the Flood-Judgment.

Major criticisms raised against this catastrophic hypothesis are essentially the result of evolution-biased geochronology. Because evolutionists attribute geologic events generated by the Flood-Judgment to processes requiring millions of years, they create problems in sequencing cause-effect relationships. They identify global and regional extinctions of plant and animal species that have no apparent cause. And they identify massive tectonic and catastrophic events in the geologic record unassociated with any evidence for extinction.²⁷⁻²⁹ These gaps between cause and effect result because the evolution-biased time frame is grossly expanded. Contracting geochronology into the framework of the Flood-Judgment clarifies many cause-effect relationships evidenced in the catastrophic nature of the fossil record.³⁰

The catastrophe hypotheses now being applied by evolutionists to explain global mass extinctions are irreconcilable with the Darwinian evolution model of gradual biological change.³¹ The uniformitarian beliefs that brought evolutionary geologists and biologists together appear considerably less cohesive today as increasing numbers of geologists are compelled to return to catastrophe hypotheses.

Tektites

Tektites are believed to occur when meteorites impact the Earth (some say meteoritic impacts with the Moon). Rock and sand are vaporized by an explosive force that ejects glass-like tektites into ballistic orbits scattering debris over a large area. They are found in both sediments and as surface artifacts (e.g., over central Australia) over a wide geographical area. Microtektites are found in sediment cores from the Indian and Pacific oceans.^{32, 33} The global distribution and stratigraphic occurrence of these collision residuals are evidence of asteroidal impacts during times when the sediments were being deposited.

Rare Meteorites

An exotic class of evidence for large asteroidal impacts comes from the composition of certain rare meteorites. Two types of meteorites known as shergottites and nakhlites originated as fragments of solidified, once molten rock. The fragment known as the Shergotty meteorite is believed to have originally been part of a lava flow. It is postulated that a large meteorite hit the solidified lava and ejected chunks into space.³⁴ Where was the parent lava flow? Earth, Mars, the inner planets or the Moon become possibilities.

Geochemists at the University of Arizona discovered a predominance of l-form amino acids in a sample of the Murchison meteorite. The discovery of organic compounds is rare in meteorite samples and is usually attributed to contamination of the meteorite after impact. The significance of l-form amino acids is their association with biosynthesis. Laboratory synthesized amino acids are produced in equal proportions of l-form and the mirror-image d-form amino acids.³⁵ If the identification of l-form amino acids is confirmed for the Murchison meteorite, this could be another example of ejecta thrown into space by the impact of a large asteroid on Earth. In this scenario the ejecta would establish an orbit, eventually returning to Earth.

It is also possible that other meteorites conclusively shown to contain organic matter are products of large asteroids impacting Earth during the Flood-Judgment.

Effects of Asteroidal Impacts

In 1908 an explosive force equivalent to 50 megatons is thought to have destroyed an area of Siberian forest 100 km in diameter. This devastation is now suspected by some astrophysicists to have been caused by a 100-meter fragment of Encke's Comet.³⁶ As Clube and Napier observe:

The current over-abundance of interplanetary particles, fireball activity and meteor streams in Apollo orbits all seem to bear witness to a sky that must have been exceedingly active within the past few thousand years. We see today the remnants of what must have been larger and most impressive pieces of cometary debris. Although these facts are 'well known,' astronomers do not seem to have appreciated their general implications.³⁷

Table 1 shows the different energies involved in various Earth processes. Impacts of asteroids the size of Ishim and Reitz may have represented a considerable energy input. Although this article suggests that multiple large asteroid impacts occurred over the Earth during the Flood-Judgment, several reports have recently examined the effect of single impact events. These single impact scenarios can be useful in demonstrating the awesome destructive forces released by colliding asteroidal bodies.

Table 1
Energy of Various Earth-Related Processes

Process	Energy (ergs)
Earthquake (Chile, Alaska)	10^{24}
Earthquakes, annual total	10^{25}
Volcanic explosions	10^{23} - 10^{26}
Annual heat flow from Earth	8×10^{27}
Energy represented by formation of Barringer Crater, Arizona (1.2 km dia.)	10^{24}
Mountain range raised one km ($1600 \times 480 \times 1 \text{ km}^3$)	10^{29}
Kinetic energy of spheroid, (density 3.5 gm/cm ³ and velocity 24.5 km/sec.):	
Diameter:	
32 km	1.75×10^{32}
320 km	1.75×10^{35}
640 km	1.4×10^{36}
Rotational energy of Moon	3×10^{30}
Rotational energy of Earth	2×10^{36}
Orbital energy of Earth about Sun	2×10^{40}

(After Dachille, 1983, p. 268)

Collision with Large Comets

Astronomers have calculated that a 10 km diameter comet impacting over land would immediately destroy life over a hemisphere. They estimate the air temperature would increase to about 500 °C and windspeed would be about 2500 km/h at 2000 km from ground zero. Nitric oxides from the fireball would adversely affect atmospheric ozone. Mutagenic ultraviolet light

intensity would increase. Turco, *et al.*,³⁸ have calculated that the average global temperature rise for an impact of 10^{31} erg would result in a 15°C global temperature rise. O'Keefe and Ahrens³⁹ believe that such global heating, which is primarily due to energy transferred to the ejecta, would be short-lived due to the radiative decay lasting only a matter of days. A localized heat pulse is more probable. Perturbation of the internal currents in the core of the Earth would disturb its magnetic field. Mantle disturbances could also lead to rapid movement of the lithospheric plates. Mass extinctions of life would be expected.⁴⁰

Changes in Earth's Angle of Rotation

Recently in *Ex Nihilo*, astronomer Dodwell's model of a large asteroid tilting the Earth has been reviewed.^{41, 42} The model suggests that a large asteroid generated a 3.5 degree tilt in the Earth's axis of rotation. Because of angular momentum, the Earth has been gradually "righting" itself during the interval between 2345 BC $\pm$ 5 until 1850 when the present angle of 23.5 degrees was established again. Astronomical records and architectural evidence from Stonehenge to Karnak have been cited as tracing this shift in the angle of rotation.

The size of a single asteroidal impact sufficient to change the angle of rotation would have to be considerable. It has been calculated that the impact of an asteroid the size of Juno (190 km diameter) would change the Earth's axis only 0.02 degrees.⁴³ Energy from the impulsive impact with a large asteroid would be almost entirely converted to thermal energy rather than mechanical motion.⁴⁴ Dodwell's model suggests the Pacific Ocean Basin is the impact feature left by the collision of asteroid and Earth.⁴⁵ The circular appearance of this basin can be explained by other Earth models.⁴⁶ However, a more difficult problem is the idea that the Earth's axis has gradually readjusted throughout history without evidence of catastrophic global geodynamic phenomena over the same historical period. By contrast, a permanent tilt resulting from massive impacts during the Flood-Judgment could produce a catastrophic global response.

A shift in the Earth's axis of rotation changes the Earth's figure of rotation. Earth radius measurements and satellite observations have confirmed that the Earth bulges at the equator. Changes in the axis of rotation will cause the bulge to shift to the "new" equatorial position. A sudden change in the axis of rotation, if only by a fraction of degree, could result in very rapid adjustments on a global scale. Tremendous tension (rifting) and compression (mountain building) forces would occur. Sudden pressures would cause the rocks of the ocean floor and the continents to behave inelastically resulting in massive fracturing. After the initial shock, the Earth's outer crust would begin to establish an equilibrium to the new rotational forces.⁴⁷

Sedimentation would be affected on a global scale. Massive episodes of erosion and sedimentation would occur as oceans invade and recede from the continents. Great sedimentary basins would fill and impressive erosion features would rapidly develop where the oceans egressed from land. As land masses adjust to the new rotation, ocean currents would be slower in adjusting. The circulation in the atmosphere would respond to the changing oceanic circulation. Drag

effects resulting from changes in geography would also affect atmospheric circulation. Weather patterns would be directed by these adjustments toward global equilibrium. Climates would be severe and wide-ranging until equilibrium was established.⁴⁸ If such a scenario is expected from a small shift in the Earth's axis, then these events must have been many times compounded during the Flood-Judgment.

Effects on the Earth's Magnetic Pole

A shock impulse of 1.5 to 30 seconds has been estimated for the collision of asteroids 32 to 640 km diameter. Only one percent of the kinetic energy of impact would be required to explosively evaporate the asteroid.⁴⁹ Dachille has proposed a model in which the Earth is composed of concentric shells. The boundary layer of each shell represents a major zone of discontinuity in physical and chemical properties (Figure 5). The existence of such boundaries is supported by geophysical data on the Earth's interior as interpreted by geophysical theory. The model proposes that when any great impulsive force impacts the Earth, stress will occur on all boundary layers. For example, impact of a 320 km diameter spheroid at 32 km/sec applies an impulsive stress of about 4×10^{10} dynes/cm² on a concentric shell 1000 km below the surface. By comparison, basalts fail in shear stress around 8×10^8 dynes/cm².⁵⁰

The boundary layers at various levels will respond to an asteroidal impact differently, depending on the energy imposed on the boundary layer and the physical and chemical nature of the layer. Discontinuities would be expected at each boundary layer. At each lower boundary the fracture energy would be less and, therefore, less fracture and relative motion at each lower shell boundary. The relative displacement of each shell could then lead to geographical pole displacements. According to Dachille:

If the shells down at 1,000, 600 and 400 km levels were to fail in shear sequentially or simultaneously there would appear to be no difficulty in obtaining geographical pole displacements of 20° to 30° .⁵¹

Pole displacements resulting from an episode of multiple massive impacts suggested for the Flood-Judgment could explain the phenomenon of "pole wandering" described by geophysicists studying magnetic orientations of various rock strata (Figure 5).⁵²

What size asteroid could affect shell slippage within the mantle? Dachille calculates that a spheroid 175 km in diameter (density of 3.5 gm/cm^3) would provide sufficient impulse energy. Smaller spheroids (15 to 25 km diameters) could provide adequate momentum-energy content to displace sizeable portions of upper mantle shells and crust if off-center impacts are considered.⁵³

Asteroidal Impacts and the Flood-Judgment

The term Flood-Judgment used throughout this article stresses the true reason for the global flood catastrophe. It was *not* an accidental encounter with a swarm of asteroids, meteorites and comets. The Flood-Judgment was ordained and executed by God. It was not an "act of nature," but an act of judgment against human rebellion. The Bible faithfully records the chronological history of this judgment. This historical account provides the framework within which scientists are free to develop Earth models.

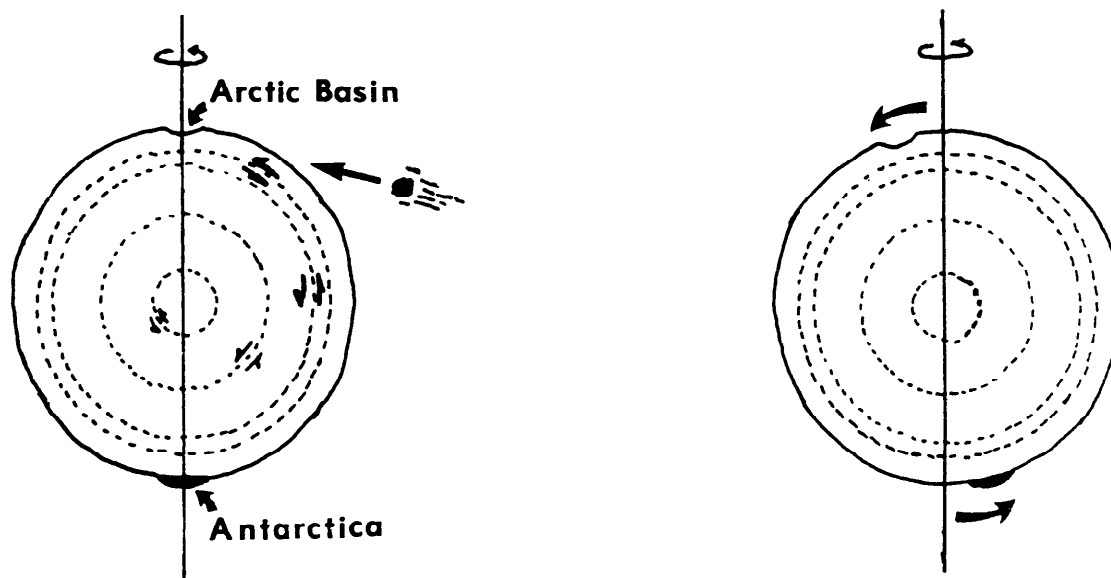


Figure 5. Representation of Dachille's model for geographical magnetic pole "wandering." The Earth responds to an asteroidal impact as successive layers of shells. Discontinuities in movement at the boundaries result in geographical magnetic pole displacements, although true axial displacement may be small. (Redrawn after Dachille, 1983, p. 274.)

Did Earth encounter an asteroidal bombardment at the time of the Flood-Judgment? The possibility of ice and rock debris existing in outer space has been confirmed by exploration of the Solar System.⁵⁴ Scripture teaches the existence of waters above the atmosphere (firmament). Genesis records during the second day of Creation, God separated the primordial ocean into two parts. One portion was below the atmosphere and the other above.⁵⁵ Both scientists and theologians have considered the possibility that the waters above the atmosphere implied a vapor canopy.⁵⁶ This canopy covered the Earth during the time before the Flood-Judgment and provided a "greenhouse" effect. Evidence for a more uniform and moderate global climate is found in the fossil record.⁵⁷ Some scientists have suggested that the collapse of this vapor canopy was the source of the Flood rain.⁵⁸

Morton, a geophysicist, has argued that a thick vapor canopy would create a surface temperature profile too high for life to exist. As an alternative, he proposes a pre-Flood Earth with orbiting rings of ice particles.⁵⁹ This model receives some empirical support from observing the rings of the outer planets: Jupiter has one ring; Uranus has nine; and Saturn has too many to count.⁶⁰ One of Saturn's moons, Enceladus, appears to be a 490 km diameter ball of ice.⁶¹ Recently it has been argued that impact features on the Moon suggest collisions with orbiting material.⁶²

Scripture supports the concept of waters above the atmosphere being responsible for the 40 days of continuous rain.⁶³ However, the nature of the waters above the atmosphere may be more than a vapor canopy and/or ice rings. After separation of the primordial ocean, the composition of the water below the atmosphere was such that dry land appeared.⁶⁴ On what exegetical basis would we assume that the waters above the firmament are compositionally different from the waters below? The implication is that the mineralogical potential of the waters above the atmosphere were the same as the ocean from which dry land was formed. This assumes the primordial ocean was a homogenous mixture before division by the atmos-

phere. The waters above the atmosphere could then be expected to contain mixtures of ice and rock. It is possible that the comets, asteroids, meteorites, and outer planetary moons (and planets?), excluding the uniquely created Earth and Moon, are remnants, a reminder, of the pre-Flood "waters above."

Whatever the origin of asteroidal bodies — dense nursery clouds of comets, collapsing rings of primordial ice, or some other extraplanetary source — the Earth, Moon and planets of the Solar System may have been exposed to a massive bombardment of asteroidal material. Evidence exists which supports the hypothesis that a major episode of impacts was concentrated within the time of the Flood-Judgment. This provides an energy source and a trigger for other geodynamic phenomena. The energy released by the asteroidal impacts of the Flood-Judgment could have contributed to a transformation of Earth's geography.

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QUOTE

Little wonder that we should at last come to celebrate the imagination as the mind's special prerogative which makes man independent of all creation, of all being, but his mind itself. It would be a mistake, however, to conclude that the alchemy practiced upon being by the emancipated imagination is restricted to poets. Philosophers and theologians and scientists and politicians and social workers—the gamut of "professional" minds within what is left of the polis—are as tempted to illusions as the poets. . . .

Indeed, the imagination has sometimes become a substitute Lord and Giver of Life, not only for the poet but for a range of would-be makers of being; the imagination, liberated from its responsible grounding in reality, creates a variety of coloring books to tempt our happy greens. . . .

Today, from particle physics to astronomy, from the formulae of DNA and the mathematics of genes to the structure of nations into one nation, the order of being is largely presumed not only in the *keep* of human mind, as in the orthodox virtue of stewardship, but resting in the mind as cause—mind as the determinant of order. Now when this assumed position is pressed firmly, its holder will deny the charge sometimes, not always. But from our actions in nature, that supposition of man's power as cause appears dominant of the actions. At the least we must conclude that the modern sense of responsibility to order is changed from what St. Augustine understood it to be when he defined virtue as "rightly ordered love." It has become *rightly ordered power*, the *rightly* justified by man's imagination.

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SPECIAL FEATURE

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

WALTER E. LAMMERTS*

Received 16 November 1983; Revised 10 April 1984

Introduction

If my memory is correct, I started accumulating these references on various overthrust faults around 1954-1956 when I was in Livermore, not too far from the library at the University of California, Berkeley.

Perhaps the most interesting reference in this first group is the report of an overthrust in nearly flat strata by Rogus. It would be most interesting to have a field study made of this, since it appears that there could be no appeal to the pressure of mountain uplift as a cause of the presumed overthrusting.

These are being published in the hope that some of our geologically-minded members might be able to study them, should they be near a large library, and prepare a report. Also possibly a field study could be performed.

Undoubtedly hundreds or even thousands of overthrusts must have been described in various publications since 1956. It would be most interesting if the total area of the earth's surface in which strata were in 'the wrong order,' in terms of the assumed universal sequence of fossiliferous rocks, were known.

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*Walter E. Lammerts, Ph.D., Fellow of the Creation Research Society, receives his mail at P.O. Box 496, Freedom, CA 95019.

BOOK REVIEWS

Betrayers of Truth; Fraud and Deceit in the Halls of Science by William Broad and Nicholas Wade. Simon and Schuster, New York. 256 pages. \$12.95.

Reviewed by Jerry Bergman*

Introduction

In the opening pages Broad and Wade state:

According to the conventional wisdom, science is a strictly logical process, objectivity is the essence of the scientist's attitude to his work, and scientific claims are rigorously checked by peer scrutiny and the replication of experiments. From this self-verifying system, error of all sorts is speedily and inexorably cast out. (p. 7)

However the authors' thesis is that this belief is false and they clearly demonstrate that the supposedly "fail-safe" mechanisms of scientific inquiry often do *not* correct the frauds that they claim have become "epidemic" in modern science. The lure of being "first," of prestige, research grants, trips to Hawaii and other exotic places for conferences, and of big money, lead many scientists to abandon any lofty ideals they may have originally had.

As Broad and Wade stress:

Scientists are not different from other people. In donning the white coat at the laboratory door, they do not step aside from the passions, ambitions and failings that animate those in other walks of life. (p. 19)

Fraud in science is seldom the invention of data. It most often involves alterations, ignoring certain results, and fudging enough to change a close, but non-statistically significant result, into a statistically meaningful one.

After reading this book, one is inclined to agree with the Biblical claim that "there is no man who does not sin." (I Kings 8:46) and more directly "If we say that we have no sin, we are deceiving ourselves." (I John 1:8)

Scientists as Humans

Broad and Wade are to be commended for their superb detective work to develop a more realistic picture of scientists. Fraud is so extensive that they conclude that "science bears little resemblance to its conventional portrait." (p. 8). A major problem in dealing with this, the authors note is (quoting from Robert Walker):

a certain amount of arrogance within the scientific community . . . that we know best, and so therefore, we have asked the questions, and if we don't ask the questions, no one else should. (p. 12)

Vested interests operate to prove pet theories, and researchers don blinders which prohibit them from seeing anything else other than what he or she wants to see. These are, the author aptly illustrates, common problems.

The authors also discuss in detail the scientific method and especially the difficulty of "proving" science hypotheses. A good example of this difficulty, they note, is "the theory of evolution [which] is another example of a theory highly valued by scientists . . . but which lies in a sense too deep to be directly proved

or disproved." (p. 17) They stress that once theories are established, they are not so easily overturned, regardless of the new information brought to light which may contradict the now hallowed "written in stone" theory.

Among the reasons for deceit is the fact that *theories* are the goal of science, not a collection of dull facts. Because it is sometimes difficult to conform facts into theories in situations where there are many anomalies, in trying to "prove" one's theories, there is a strong temptation to play loose with the facts. The desire to win credit, gain respect from one's peers and become eminent has, from the earliest days of science, brought with it the temptation of consciously lying, distorting or ignoring evidence and going beyond data without informing the reader.

A major problem is that science, by its nature of communicating via publication "tends to record only the deeds of those few who have successfully contributed to knowledge [of science] and to ignore the many failures." (p. 35). Researchers, the authors note, both deliberately and subconsciously tout the facts which support one's theory, modify those which do not quite support it, and ignore those which do not.

Indeed the system of science encourages deceit. Careers are at stake as are jobs and, literally, one's livelihood. The pressure to get an article published, make a name for oneself, securing a prestigious prize or being asked to join an editorial board all entice cheating.

An excellent section on the mythology of science is also included. Broad and Wade show that, contrary to popular opinion, science is often not self-policing. Scholars do not always read the scientific literature carefully. Science is often not a very objective process. Dogma and prejudice, when suitably garbed, creep into science just as easily as into any other human enterprise, and maybe more easily, since their entry is unexpected.

Science as Religion

Broad and Wade note that science performs part of the inspirational function that myths and religion played in less developed societies (p. 130). They add:

. . . that nonrational factors are also important [in science] and that scientific belief, particularly when in the traumatic conversion from one paradigm to another, has certain elements in common with religious belief. (p. 133)

As Feyerabend in his book *Against Method* notes, for most scientists the slogan "freedom for science" means "freedom to indoctrinate not only those who have joined them but the rest of society as well . . ." (p. 134)

The major problem with fraud is the problem of science itself, namely:

Scientists see their own profession in terms of the powerfully appealing ideal that the philosophers and sociologists [of science] have constructed. Like all believers they intend to interpret what they see of the world in terms of what the faith says is there. (p. 79)

Data Collection

One of the better chapters is on self-deception and gullibility of scientists. The authors give example after example that "researcher's propensity for self-delusion

*Jerry Bergman, Ph.D., receives his mail at 1306 N. Orleans, Bowling Green, OH 43402.

is particularly strong,” especially when examining other species and imputing various personality traits to them, adding, “the fact is that all human observers, however well trained, have a strong tendency to see what they expect to see.” (p. 114) Randi (1982) feels that scientists are “more easily deceived” than the public in some areas of research.

Broad and Wade cite a study that demonstrates how data collection is affected by preconceived notions. Rosenthal related to chosen scientific observers that were to test two groups of rats: one “maze bright,” and the other group “maze dull.” As expected, the maze bright rats were rated as superior—when, in fact, they were not, for the rats were randomly divided into the two groups and *none* were specially trained. The experimenters saw what they wanted (or expected, demonstrating the “expectancy effect”)—perhaps unconsciously.

The Wolins study, which involved a request for raw data from 37 authors of psychology papers, was also reviewed. Of the 32 that replied, 21 reported that “unfortunately their data had been misplaced, lost or inadvertently destroyed.” The authors conclude that one might have supposed that “something so precious as raw scientific data would have been kept in less accident-prone conditions.” (p. 78) And of the nine sets of data which were sent to the researchers, three contained gross errors in their statistics, causing the authors to conclude that “the implications of the Wolins study are almost too awesome to digest.” (p. 78) Fewer than one in four scientists were willing to provide the raw data on request without self-serving conditions. This is hardly the behavior of a “rational, self-correcting, self-policing community of scholars.” (p. 78) While the authors may be too harsh on the scientific community, nonetheless their criticism clearly has much validity. They also cite several other studies which produced essentially the same conclusions.

In reviewing the book, I viewed the discussion intellectually, until I realized that some work that I had used was done by a researcher involved in a scandal! The studies were published in reputable journals and, no doubt, many other researchers also have relied upon the results. Indeed, probably *most* researchers have quoted data which is fraudulent or at least inaccurate. The tragedy of all of this is that, as admitted by the authors “to a probably insalubrious degree, science has replaced religion as the fundamental source of truth and value in the modern world.” (p. 219) The irony here should be obvious. Science relies heavily upon human authority, especially the authority of its luminaries who, through a series of chance events achieve prominence. As Bacon remarked, (quoted by the authors) “Truth is the daughter, not of authority, but of time.” (p. 224)

The problem of objectivity is very serious. Most researchers believe passionately in their work, in the technique on which they rely and the theories they are trying to prove. While this passion may have an advantage in enabling the scientists to sustain the effort necessary to produce results, it may also color and even distort their results. And unfortunately:

Science is a complex process in which the observer can see almost anything he wants provided he narrows his vision sufficiently. (pp. 217-218)

Nowhere is this more evident than the admittedly highly emotional area of evolution.

Reproducibility

Replication is another myth the authors attack. First of all, it requires that the original experimenter delineate exactly what was done—the method, amount of chemicals or whatever. Replication, though, is not easy because experiments often cannot be or are not perfectly described in the literature. Unknown variables may interfere. Research may work a certain way with a specific strain of mice but a slightly different strain may produce different results. Further the authors note that the published descriptions of the experiments are often detailed but still incomplete. Many researchers have the expertise to replicate only those experiments that are specifically in their field. Also, many lack the investment of time, money and motivation.

For this reason, the authors claim that “replications are . . . rarely performed.” (pp. 79-86) The reward system of science, the authors explain, is such that the concern is with originality, and being second wins nothing. Replication is certainly not original and is primarily arduous work with little potential for rewards. They conclude:

The notion of replication, in the sense of repeating an experiment in order to test its validity, is a myth, a theoretical construct dreamed up by the philosophers and sociologists of science. (p. 77)

Prejudice in Science

The authors give example after example of the sad fact that experimental evidence alone is all too often not enough to overturn an older theory. No matter how valid, it can often be explained away. An excellent example is the Hungarian physician, Semmelweis, who discovered that childbed fever, which typically caused 10-30 percent mortality in hospitals through Europe, could be largely abolished by the doctors washing their hands in a chlorine solution before examining the mother. In his own clinic, the mortality rate dropped from 18 to zero percent. This compelling evidence failed to convince his superiors in spite of the fact that the doctors who were not using this simple germicide technique were still losing the same number of patients as Semmelweis did before his innovation. His procedure, while simple and obvious to us today, went contrary to their whole theory of medicine. His fellow doctors, as scientists today, were not willing to accept a new idea easily. Semmelweis was eventually dismissed from the clinic and spent the last years of his life trying to convince Europe of the effectiveness of his system. Doctors simply could not accept the fact that they had unwittingly caused so many patients to die by not washing their hands. One reason for Semmelweis' failure to convince contemporaries was that he was not an effective propagandist. The results of one's research, regardless of merit, will not be implemented unless they are effectively communicated. A brilliant scientist must be first a brilliant communicator.

In frustration after 20 years of trying, Semmelweis entered a mental hospital and his ideas were forgotten until Lister again fought the battle. He was successful. As Broad states (p. 140), the claim of science, that it differs fundamentally from other belief systems in that it rests demonstrably upon reason alone, is not true. This claim must be modified in the light of what historians have to say about scientists' resistance to new information and their tendency to reject observations

via the prism of their own theories. Clearly "history shows . . . a community of scientists is often ready to swallow whole the dogma served up to them as long as it is palatable and has the right measure of scientific seasoning." (p. 193)

Elitism in Science

The refereeing system of the power elite is often a censorship system which is, at times, pernicious to the extreme. The authors also discuss the problem of elitism in science resulting in ideas becoming accepted because of *who* said them and not because of the merits of what is said. This, they conclude, is a serious problem, "bad ideas get accepted because their proponents are members of the elite." (p. 98)

More seriously, they stress "good ideas may be ignored because their advocates may have poor standing in the social structure of science." And the elite tend to both perpetuate their own ideas and create the next elite. The next elite are those that agree with the ideas of the previous elite. Thus, elites and ideas both perpetuate themselves, resisting change and progress, although, albeit, also resisting fads.

A major problem in the editorial review process is the lack of reliability. The authors cite several studies to support their conclusion that chance is extremely important in whether a paper is published. One study took ten "high quality" articles in psychology which were published two or three years earlier and resubmitted them, with the author's names and affiliations changed, to the very same journals that had previously published them. Only 18 percent of the articles were recommended for publication, the rest were rejected . . . yet these very same journals published the articles previously! Other studies found that when the results of the study agree with the philosophical bias of the reviewer the likelihood of the acceptance was higher.

Broad and Wade also discuss such things as a grant-funding peer review (those individuals who determine which applicant is awarded research monies have a major influence on what science is doing). A major problem is that "in vogue" research is funded and that which contradicts prevailing scientific belief structures, such as evolution, is less apt to get funded.

Specific Scientists

Broad and Wade and others launched serious attacks on Charles Darwin. Such works as *Darwin and the Mysterious Mr. X*, by Loren Eiseley and *A Delicate Arrangement* by Arnold Brackman claim that Darwin plagiarized most of the theory of evolution and his theory of natural selection.

Eiseley presents indisputable evidence that the basic tenets of the theory of natural selection were set forth by the now-forgotten naturalist Edward Blyth, years before the publication of Darwin's *Origin of Species*. (From dust jacket of Eiseley book.)

The editor of Brackman's book concludes that Darwin's plagiarizing from Wallace is "one of the greatest wrongs in the history of science," adding that "Darwin and two eminent scientific friends conspired to secure priority and credit for that theory [of evolution and specifically the mechanism of evolution, natural selection] for Charles Darwin." (From introduction of Brackman's book.) And a reviewer of the book (Williams, 1982) notes that the conclusion of the book is that "Darwin stole (not too harsh a word) the theory

from Wallace." Broad and Wade include an excellent discussion of Darwin's appropriation of the work of Blyth and others. Evidence for this is similarities in phrasing, the choice of specific examples to support the theory and the use of certain uncommonly used words. Broad and Wade bring out that even contemporaries of Darwin such as Samuel Butler criticized Darwin for "passing over in silence those who had developed similar ideas [before he did]." (p. 31)

Also included in an excellent balanced discussion of the Soviet Lysenko affair, the Krammerer attempt to prove Lamarckian biology (which resulted in his suicide) and the Morton affair, for which the data for his racist evolutionary views were gathered between 1830 and 1851, was not exposed until 1978 by Stephen J. Gould of Harvard. As to the Piltdown affair, the authors seem to be superficially acquainted with the details, and relied heavily upon the work of Millar (1972). Other researchers have come to different conclusions as to who perpetuated the hoax. The authors even touch on such topics as Uri Geller and the Shroud of Turin. While the book is excellent on fraud in science, the discussion of offshoot issues, such as the Cyril Burt affair, the genetic vs. environment controversy, etc. seemed rather superficial and in some places inadequate or incorrect.

Summary

If science is self-correcting, why do we have examples such as Ptolemy, Galileo, and Newton whose work remained uncorrected for decades, and was poor even by the standards of ancient astronomy (p. 24), according to the authors. Although in some cases, it may be that the opposition to a scientist's work may be suppressed or does not receive the needed publicity or maybe the opposers were themselves discredited for questioning a science luminary. One could argue from this that, although it may take millennia, errors eventually are corrected. The truth comes out and the process of science does work, but it may be infinitely slower than its supporters believe. The volume also points out the wisdom of evaluating and criticizing even highly accepted theories, even those postulated years ago and rarely questioned since.

Some cases of deceit have been uncovered by reviewing a researcher's original notes. It is sometimes found that cases that "fit" were selected for published reports and those that did not were ignored. An excellent example of the authors' use of this is the eminent Millikan. He was awarded the Nobel Prize, and his challenger, whose experiments were evidently honest, became disillusioned with "a broken spirit." (p. 35)

The problems unearthed by Broad and Wade are probably, as they themselves stress, only the tip of the iceberg. In science, save replication (which is uncommon in many fields), unfortunately fraud is most difficult to detect.

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How to Teach Origins (Without ACLU Interference)
by John N. Moore. 1983. Mott Media Incorporated.
Milford, Michigan. pb, 382 pages. \$14.95.
Reviewed by George F. Howe*

Question: Who will sit down and read a 382 page non-fiction work "cover-to-cover"?

Answer: Probably very few people, but MANY teachers in grades K-16 at both public and private schools will benefit immensely if they read *How to Teach Origins* (HTTO) and finish it in a semester or a year.

Although considerable backlash has arisen because justice was mishandled by an Arkansas judge, gifted teachers of all persuasions still know that when one side of a hotly controversial issue is in the curriculum, educational ethics demands that alternative viewpoints be presented. What these same teachers may not realize is that it has been (and still is) entirely legal to explore creation and other origin alternatives as long as it is done in a non-worshipful and non-religious context. Author Moore has made all of this clear in HTTO.

In the reviewer's limited experience, "how to . . ." books in the field of education are sometimes long on methodology but short on the content needed to use the methods. Such is not so with HTTO where course material has been woven together with procedures. The reader is treated to numerous figures and the author has drafted many useful "classroom teaching aids." While no teacher can teach someone else's lessons verbatim, good teachers will appreciate using and adapting what Moore has supplied here.

Potential book buyers sometimes ask, "What will I get for the money?" The answer is the following: a preface, a lengthy introduction, a detailed "note to teachers," six chapters, a 55 question final exam, a set of 10 appendices (none of them "vestigial"), a glossary, a bibliography, a list of sources for creation teaching materials, and a thorough four-page index. Each of the six chapters begins with a set of objectives and ends with several sets of objective questions which could be used to measure how well concepts have been mastered.

In the six chapters of HTTO, Moore has presented significant, non-naturalistic approaches to the origin of the universe, life, and man. In addition to containing specific teaching methods, HTTO has in-depth discussions of geochemistry, astronomy, physical anthropology and several other fields so that this work is a science textbook as well as a methods treatise.

The author, Dr. John N. Moore, has had a distinguished career as a professor of natural science at a major public university. He has been lecturer, journalist, active board member of C.R.S., and was managing editor of C.R.S.Q. for many years. Much of the wisdom gained in these experiences is summarized for the reader of HTTO. In his own classes, Moore tested and refined the methods and subject materials of this book.

The author has been a pacesetter in the philosophy of scientific creationism and he has here imparted a new clarity as well as vigorous definition to many key words commonly used in origins discussions. He has

alerted readers to an extensive list of what he calls "cover words" that are routinely misused and that convey false impressions. This is an important contribution as the quality of origins discussions rests directly on the care given to definitions of words like "evolution," "theory," "religion," "science," "spontaneous," and many others covered in HTTO.

Moore has delved into the history and social implications of topics covered. He has distilled a compendium of excerpts from the writings of others. For example, on pages 285-287 the author has reprinted entire pages from three widely used secular textbooks (high school, college, and advanced college levels) in which the authors had included generous coverage of the creation view. This allows teachers who may feel squeamish about even mentioning creationism to see that several books in the secular trade already contain such material.

Dr. Moore has identified the limitations of science as applied to geology, astronomy, and biology. He has shown why no origins model should be called "science" in the unqualified sense.

It has been this reviewer's experience that most workers accept and use Moore's limitations quite strictly when undertaking their own research programs but turn right around to neglect or even vigorously reject them while promoting their own origins views as "science." Creationists will do true science a favor if they continue to press these limitations on their evolutionist colleagues. If the empirical nature of science is blurred in the least by macroevolutionists' careless misuse of terminology, much more than origins and philosophy will suffer.

Thus by distinguishing between two kinds of theories—historical and scientific ones—Moore has put "historical" geology in its proper place—outside the camp of pure science. Likewise he has shown just how very many of what astronomers loosely call "measurements" in outer space are nothing more than crude *estimates* based on unsupportable assumptions or questionable analogies.

All students of science have learned of the reluctance to change that has always confronted creative workers. John Moore has used several case histories including Ptolemy, Galileo, and others to demonstrate how various contradictions have been either handled or mishandled. He has spent considerable space on the difference between a "cosmology" as science and a "cosmogony" as a set of unsupported origins models. No one should attempt to evaluate the "Big Bang" concept before having read this book.

No one volume will ever be "all things to all readers" nor will any human book be free of minor flaws. But errors of grammar and spelling are remarkably few in HTTO. The reader will discover, however, that pages 263 and 264 should be reversed.

The sturdy binding of this book is of the same high quality used for expensive paperback Bibles and should hold up well.

Documentation is surprisingly thorough with only a few instances where more reference information could be desired. On page 65 there are some undocumented quoted definitions and there is one fine quote from O'Conner on page 152 which is listed as coming from his "college chemistry handbook."

Although all of the material in HTTO is applicable to private or parochial schools, some of the items could

*George F. Howe is Chairman of CRS Research Committee and Director of the Grand Canyon Experiment Station. His address is 24635 Apple St., Newhall, CA 91321.

not be used in public schools. Alert teachers will recognize these and the author has already segregated certain teaching materials at the end of various chapters into sections especially labeled for parochial schools.

Having dealt extensively with the problems of the megaevolution view and having presented a strong case for the creation model, Moore has chosen not to supply expanded discussion of special problems facing current creationist models. Creationists talk, for example, about the fixity of created "kinds" while conducting very little experimentation regarding how to trace the limits of those kinds. They discuss the impact of a global flood in vague generalities but any detailed restructuring of biostratigraphy along the lines of "flood geology" has yet to be accomplished.

Dr. Moore is not alone in having avoided this subject. None of the recent spate of anti-creationist books contains cogent criticism of scientific aspects in creationism either. These anti-creationist authors dwell instead on philosophy and religion or they attempt merely to show that one or another creationist has upon occasion misquoted or misrepresented some evolutionist's idea.

Perhaps eventually a book will be written in which there is serious analysis of scientific problems facing special creationists. It would make a fine companion volume for HTTO.

Legal aspects of the controversy have been given coverage in HTTO in that writings of Supreme Court justices and some noted attorneys (Wendell Bird, John W. Whitehead, and John Conlan) have been cited and in some cases quoted extensively.

On page 283 Moore has written that "... attorney generals in state after state have formulated opinions that scientific creationism may be taught in the public school," and in support a reference is given in note 7 on p. 263 to a 1955 attorney general's opinion in California. It is a minor shortcoming of this work that several direct quotations from more attorney generals were not included. Perhaps in another book or a later edition of this one—after the Louisiana case has been judged—Dr. Moore will develop this legal issue even more fully.

Moore has claimed in HTTO that neither new legislation nor special rules are necessary to permit presentation of creation concepts. Teachers are thus free to discuss the historical Judeo-Christian view of creation and the impact it has had on "modern science." They can legally present creationism as an acceptable alternative to megaevolution and the American Civil Liberties Union (ACLU) cannot rightfully prevent such activity.

While the author is probably 100 percent correct on these counts, the sad fact is that the ACLU might still try to "interfere" even if Moore's precepts and definitions are followed — simply because the ACLU has been known to flatly reject all definitions which run counter to their own anti-creationist plans.

They were successful, of course, in convincing one judge, who shared some of their own naturalistic biases, that he should strike down an Arkansas law which *required* creationism to be taught along with evolutionism. Yet teachers must realize that nowhere in the Arkansas judgment was the teaching of creationism *forbidden*.

Teachers must also know that although it is perfectly "legal" to bring creationism into science classes, department chairmen and administrators in some places have brought unfair pressure against some teachers for teaching two models of origins. This means that the law is one thing and political maneuvering at the local school level is another. Let each teacher who intends to bring creationism into public school classes read HTTO, use wisdom, proceed slowly by testing the waters, and count the personal cost that may be involved in such an endeavour—even though it is "legal."

In conclusion, *How to Teach Origins* is a fabric of closely worded arguments supporting the teaching of special creation as origins in school classrooms. It is a balanced presentation of science, history, philosophy, and theology as these subjects bear on first origins. This book should be in the hands of every science instructor.

* * *

The Great Evolution Mystery, by Gordon Rattray Taylor. 1982. Martin Secker & Warburg Limited, London, and Harper & Row Publishers, Inc., New York. 277 pages. \$15.33.

Reviewed by Wayne Frair*

The British author had a notable career as a science writer and advisor to BBC television; and this book, the last of fifteen, was completed at the time of his death in December 1981. The book contains several pertinent drawings and photographs, a helpful seven-page glossary, 17 pages of bibliography, and a seven-page general index. The text, which flows well, contains a wealth of facts and quotes generally pertinent to its theme, which is that natural selection can effect only small changes but not those necessary for macroevolution.

Darwin's concept of evolution included variation and natural selection, and Taylor says that natural selection theory has now hardened into a dogma known as neo-Darwinism (p. 24). To this he is opposed and says: "One is tempted to say evolution takes place in spite of natural selection rather than because of it" (p. 159). But an alternative position, "the realization of a divine plan" (p. 13) is just as, or possibly even more, odious to him. The book rears up a multitude of evolutionary problems and somewhat parrot-like keeps asking how natural selection could account for these. Some of them are:

1. The suddenness with which major changes in pattern occurred and the virtual absence of any fossil remains from the period in which they were alleged to be evolving (p. 137).
2. The fact that subsequently no new phyla have appeared, and no new classes and orders. This fact, which has been much ignored, is perhaps the most powerful of all arguments against Darwin's generalization (pp. 137-138).
3. Adaptations and developments, such as the development of the eye, which call for coordinated changes which could hardly occur by chance.

*Wayne Frair, Ph.D., is Professor and Chairman, Biology Department, The King's College, Briarcliff Manor, New York 10510.

4. The appearance of structures before the need for them arises (preadaptation) (p. 115).
5. The occurrence of parallel and convergent evolution, in which similar structures evolve in quite different circumstances.
6. The puzzle of how organs, once evolved, come to be lost (degeneration) (p. 138).

The best answer Taylor can produce involves the expression and repression of particular genes carried in the gene banks of various organisms. Taylor's term for embryonic recapitulation is "masking theory." The concept of recapitulation is outmoded to an extent far greater than I feel is appreciated by Taylor who used as evidence for his belief the false idea that gills appear in development of the human embryo.

One might think that an author who can understand so clearly and express so convincingly the evidence for design as seriously problematic for evolutionary changes, would consider earnestly an alternative for macroevolution. But no, for him evolution is a fact and creationism is only very briefly acknowledged at the beginning and end of the book; and then creationists are chided for exploiting the new anti-Darwinian climate by pressing for their position.

It could be that creationist readers of the book will, like myself, find the work, though informative, depressing because of its rising no higher than the level of self-design of organisms. On the other hand, the work as a whole may serve to promote progressive thinking as illustrated by the following quote from the concluding section:

There must be 'laws of form' but unhappily we do not know what they are . . . (p. 244).

Until we understand the laws of form we are in no position to say that we understand the mechanism of evolution.

Progress has been prevented by the rigid dogmatism of the neo-Darwinians and it is quite significant that the first crack in the structure they erected has come on the subject of 'punctuation.' That is, on the question: is evolution gradual or do abrupt discontinuities occur? As Professor Rupert Riedl of Vienna puts it: 'Most of the unexplained phenomena in macro-evolution were first minimized, then swept under the carpet and finally forgotten.'

Punctuationism is significant in that once it is conceded that some other mechanism than natural selection operates in evolution, even if only from time to time, natural selection is ousted from its unique position and Darwin's idea becomes merely a part of a larger theory. Of course, once one admission of this calibre is made, the situation becomes much more fluid and scientists will feel free to look around for new interpretations in a much less inhibited manner, free from any fear of having their careers damaged by the awful charge of unorthodoxy.

. . . Now, however, the attempt to present Darwinism as an established dogma, immune from criticism, is disintegrating. At last the intellectual log-jam is breaking up. So we may be on the verge of major advances (p. 245).

* * *

COSMOS: Carl Sagan's Religion for the Scientific Mind, by Norman L. Geisler. 1983. Quest Publications, P.O. Box 38100, Dallas, TX 75238. 63 pages. \$2.00.

Reviewed by Wayne Frair*

"Sagan's religion," according to Geisler, "is not a traditional one" because worship of a supernatural being is not involved nor is the performing of any particular ritual. "On the contrary, Sagan's religion is a faith in which the universe is a great cathedral, and scientific wonder and exploration are the attitudes of the devout. It has no authoritative book for guidance. Instead, the scientific method is used to reveal new knowledge and open up fresh possibilities of understanding our vast cosmos." Sagan is, Geisler observes, "the number-one spokesman for the new religion of the COSMOS" because of "his visibility, clarity of perception, and literary productivity." (Introduction)

The small paperback booklet contains an introduction summarizing the content and has other chapters titled as follows: *Cosmos: All That Is*; *Cosmos: Object of Awe*; *Cosmos: Creator of Life*; *Cosmos: Source of Salvation*; *Cosmos: If It Could Speak . . . ?*; *Cosmos: Its Final Destiny*; *Cosmos: Will It Rise Again?*; *Cosmos: Creator or Creation?*; *Cosmos: A Message From Outer Space*.

What is Sagan's view regarding the possibility of a Creator? For Sagan the most humble conclusion is Agnosticism; and from Sagan's viewpoint and that of other secularists any concept of a Creator is unnecessary and uneconomical. As Sagan says: ". . . men may not be the dreams of the gods, but rather that the gods are the dreams of men." (p. 19)

Evolution, according to Sagan, "is a fact, not a theory." (p. 30) Interestingly, Sagan also feels that man has a moral obligation not only to "ourselves but also to the COSMOS" (p. 31) from which we have come. There is, according to him, "obligation to perpetuate life in the COSMOS." (p. 31) Geisler paraphrases Psalm 95:6 as Sagan would view this: "Let us kneel before the COSMOS, our maker." (p. 32)

Sagan believes that "there must be other starfolk" (p. 45) and "we have another five or 10 billion years left" (p. 46) before the ultimate death of the COSMOS. But there also is a suggestion from Sagan that the universe may be eternal. As Geisler points out, "the scientific evidence from the cosmos pushes one back to a Creator of the cosmos," (p. 52) which Sagan, of course, does not acknowledge. This, writes Geisler, does not meet the test of science because of the causality principle.

This little booklet can be recommended as a valuable compilation of material from Sagan with evaluation in the light of Christian theism.

* * *

QUOTE

. . . Did God wash his hands after creation? That seems to be a principal philosophical argument culminating in Nietzsche and celebrated by post-World War II theology, an argument that safely removes the propounder of the argument. . . .

Montgomery, Marion. 1983. Imagination and the violent assault upon virtue. *Modern Age: A Quarterly Review*, 27:122.

Two Men Called Adam, by Arthur C. Custance. 1983. Doorway Publications, Brockville, Ontario, Canada. 273 pages. \$10.50.

Reviewed by Wayne Frair*

Author Custance again has demonstrated his acumen in a book which is important to all who respect Biblical revelation. Even though stressing theological considerations in comparing Adam and Jesus Christ, he has included appropriate scientific information with which he obviously is quite familiar.

The position is made that a human being equals a spirit plus body, the body being far more than just a house for the spirit. The spirit never is (ghost-like) disconnected from its body, for at death the spirit of the Christian "is instantly joined to its resurrected body." (p. 84) Since many have accepted the Greek view of the physical body as a prison, they have overlooked the importance of this body and more easily accepted an evolutionary origin for it; but since the physical body is "part and parcel of our hope of glory" (p. 242), an evolutionary origin of this body is unacceptable. We may not, Custance argues, push man back into "a dim period a million or more years ago" (p. 246), and creation as an alternative to evolution is not to be divorced from its spiritual implications.

Because this book, though at times controversial, will challenge contemplation and inspire reverence, it deserves wide readership.

* * *

The Bible and Astronomy, by John C. Whitcomb. 1984. BMH Books, P.O. Box 544, Winona Lake, Indiana 46590. 32 pages. \$2.25.

Reviewed by H. L. Armstrong*

This little book is based on a chapter by Dr. Whitcomb in *Design and Origins in Astronomy*, published by the Creation Research Society; and it deals with what might be called the theological implications of the astronomical universe.

Topics include: the universe as evidence of God's power; the origin of the universe, by an act of sudden creation; and the destiny and purpose of the universe.

It is shown that Scripture requires the creation to be understood as having taken place in six literal days, not in billions of years. Also, the fact that the heavenly bodies were created after the Earth is utterly incompatible with any evolutionary origin. Incidentally, there are other instances in which the sequence of creation disagrees flatly with that supposed by evolution: for instance, birds before reptiles.

The question, whether there are corporeal beings living on other planets, is considered. The author points out that not only does Scripture say nothing about such beings, but it provides strong reason for believing that there are none.

It is maintained, quite rightly in my opinion, that the matter of the sundial in Hezekiah's time, and the long day in Joshua's, are to be viewed as outright miracles. So we can be saved the work of trying to invent semi-naturalistic explanations.

This work should be especially helpful in presenting to those who have not accepted it yet God's claim on their allegiance.

*H. L. Armstrong teaches Physics at Queen's University, Kingston, Ontario, Canada.

LETTERS TO THE EDITOR

Mistakes in Alleged Fossils

Recent geologic investigations and experimentation have provided conclusive evidence exposing most, if not all, of the alleged pre-phanerozoic, biogenic forms discussed in a 1961 *Scientific American* reprint,¹ as misinterpreted pseudofossils.

Such specimens as *Aspidella billings* (Canada), or the structurally similar *Dickinsonia costata* (Australia), *Spriggia annulata* (Australia), metazoan burrows from Zambia, arthropods from the Sierra Ancha region of Arizona, and others too numerous to list, have failed to withstand critical examination by trained professionals.

Several authors²⁻⁷ have amply demonstrated in the literature, the spurious nature of these and other "fossils," now generally accepted and popularized as "primitive, ancestral metazoa." Cloud's and Hofmann's articles^{8, 9} best detail the acute problems created by an all-too-casual acceptance of superficial appearances, as authentic representatives of the fossil record.

Samples studied appear to fall into four broad categories: (A) naturally occurring petrologic/mineralogical features; (B) ephemeral markings produced by modern organisms; (C) misdated lithologic units and (D) contamination from overlying formations. The general conclusion reached by many of these researchers is that in spite of numerous reports to the contrary, there are no unequivocal metazoa in rocks of indisputable Proterozoic age.¹⁰⁻¹² Ironically, Martin Glaessner, who wrote the original *Scientific American* article/reprint, makes this same admittance in a later paper!¹³

There appears to be some doubt expressed in this reprint article, that the strata containing the structures are even Pre-Cambrian in age. On page seven Glaessner admits that no radioactive minerals are present in the Ediacara Hill formation for dating purposes.

Therefore, in the interest of academic honesty, the publication, "Pre-Cambrian Animals," which I understand is still being distributed for *Scientific American* by W. H. Freeman & Co., should be discontinued. The data contained within its covers is somewhat misleading, just as the author's conclusions are dubious. Sloppy research work of the calibre represented by this report argues for a serious review of the current status of Proterozoic paleontology.

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Ronald C. Calais
137 Oak Crest Dr., Lafayette, LA 70503

Answer to Howe

This letter to the Editor is in response to George Howe's request that interested readers send suggestions regarding what types of research projects might be carried out at the CRS Grand Canyon Experiment Station (GCES). For the text of Howe's article, see *Creation Research Society Quarterly*, June 1984, pp. 9-17.

Your study of crops may be augmented in several ways, by considering problems related to energy. For example, I recall hearing about a plant native to Manilla (unfortunately I have forgotten its name, but a botanist familiar with the region should be able to tell you what it is), that might be grown to produce gasoline. Apparently, preliminary studies of it in Manilla have shown that extracts from its fruit can be refined to produce fuel. Similar studies could be done with sugar (which is currently being used in Brazil as a major source of fuel). Such studies might require an engineering department at the station to examine the technology required for the production and use of such fuels.

Alternatively, attention could be turned to methods of growing crops. For example, hydroponics could be examined (preliminary data could be drawn from work done already in Europe, the Middle East, and parts of the U.S.). Hydroponics may be able to increase the productivity of a given area to 5x-20x that of fertile, moist regions (estimates I have seen range from 20 to 80 kg/m²/yr, as compared to 4 kg/m²/yr for prime agricultural land). Hydroponics has further advantages in that the producer is freed from limitations imposed by climate and effects of pests and pollutants are minimized. The principle limitations to hydroponics are those imposed by the costs of energy and fertilizer, but both of these may be eliminated through the use of recent concepts in waste management, *vis-a-vis* energy from waste. As you know, manure is commonly used as fertilizer. Through energy from waste technology (which needs further development and refinement) human and animal manure may be dried (using clay/sand filters and gravity), burned for energy, and the remaining mineral ash dissolved for use as fertilizer in a hydroponicum. In this manner, a high quality mineral fertilizer is produced as a by-product of energy production (or vice versa), and there is no danger of disease transmission for I know of no pathogen that can survive incineration. An engineering department might be required to examine technological alternatives. This technology has obvious applications in the third world. (As our Lord told Peter, 'Feed my sheep'; if I may take this out of context.)

Regarding your studies in genetics (hybridization and chromosome studies), it seems to me that such studies could be augmented by studies in numerical taxonomy and population genetics. Studies in numerical taxonomy, however, would require computing facilities having, I would suggest, at least 5-10 megabytes working memory, (with correspondingly large

storage memory), and NT-SYS and SAS capability. I would strongly suggest that work in this field not be limited to 'key Arizona genera,' but that a long term program should be developed for the collection of taxonomic, genetic, biogeographic, and autecological data for all plant and animal taxa. Not only would such a program produce important insight in origins research and appropriate interpretations and definitions for species, genus, . . . etc., it would provide, for the first time, a center to which descriptions of apparently new species can be sent for identification, classification and comparison with known species. Studies in population genetics may also be conducted to study the alleged relationship between rarity and genetic variability. Many ecologists and evolutionists claim that rarity leads to reduced variability which allegedly leads to extinction (but I am not convinced).

A study of the ecology of rare species would be required so that a rigorous definition of rarity may be developed, as a survey of existing literature makes such a definition almost impossible to give, even tentatively (the commonly used, intuitive definition is terribly inadequate). The world wildlife fund may be interested in funding this kind of research. (The numerical taxonomy study might also be extended to Palaeontology.)

While there exists a certain amount of such chromosomal data for commercial species, such data are almost non-existent for noncommercial species. There are a host of wild, commercially unimportant species for which there is no genetical data at all.

The orchids may be a useful and interesting family to start a genetics/taxonomy program with (for later extension to other taxa), because, as you know, it is an enormous family, many of its genera are taxonomically indeterminate, and most of the family is genetically unknown. Also, since many orchids are 'rare,' they would be well suited to studies of genotypic and phenotypic variability.

Although some of what I have suggested has little relevance to creation research, it seems to me that we as Christians, since we know man has been given dominion over the earth, have a responsibility to learn as much as we can about the ecology of the earth so that we, as good stewards, can recommend the best possible management strategies for our natural resources to the appropriate governmental authorities. We also have a responsibility as Christians to be able to show those of our neighbors who are hungry how they can become self-sufficient in food. It is fine to wish to study creation for its own sake, and to devote resources to such studies, but we must not forget our responsibilities.

I would also suggest that one aspect of the work at GCES should be the production of books, and articles in major, national and international, scientific journals so that the station can build a reputation for producing top quality studies. Otherwise, I fear that much of the work done may be ignored or little circulated. Communication of results, in my opinion, to the largest possible component of the scientific community, is an essential part of research. If communication breaks down, efforts are duplicated unnecessarily and resources wasted.

Ted Byers
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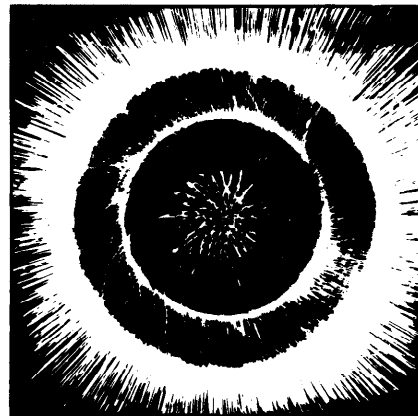


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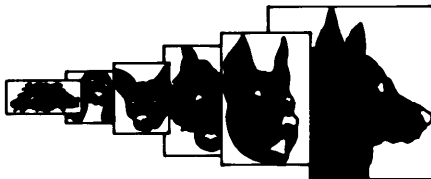
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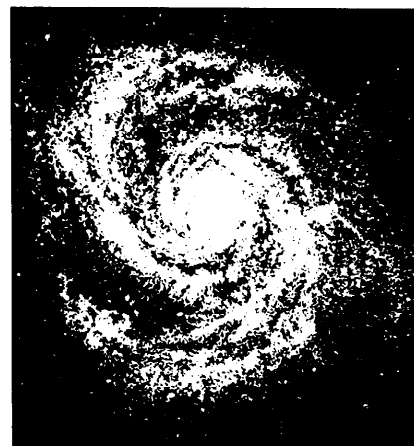
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