

CREATION RESEARCH SOCIETY QUARTERLY



Haec credimus:

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

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CREATION RESEARCH SOCIETY

History The Creation Research Society was first organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a real need for an association devoted to research and publication in the field of scientific creationism, with a current membership of about 400 voting members (with graduate degrees in science) and over 1300 non-voting members. The *Creation Research Society Quarterly* has been gradually enlarged and improved and is now recognized as probably the outstanding publication in its field.

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

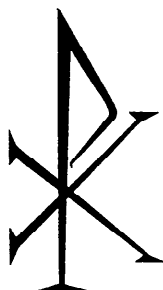


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COVER ILLUSTRATION

Forster's Tern, *Sterna forsteri*, at rest, showing characteristic wingspread upon alighting.

One of the most distinctive differences between Aves and Mammalia is the type of body covering. Yet no explanations of actual scientific nature are contained in the literature regarding specific source of a bird's finery of feathers, or the faculty of flight. Evolutionists would use such terms as "developmental pressure" or some vague reference to "Nature" to explain appearance of certain forms. If complexity is supposed to arise from necessity, then why did feathers arise in the first place, since penguin and ostrich do not fly to survive; and, feathers are not even necessary for flight, as shown by the superb aeronautics of the bat? "Feathers: Flight or Fancy?" is the topic of an interesting discussion by Willis E. Keithley elsewhere in this issue.

FEATHERS: FLIGHT OR FANCY?

WILLIS E. KEITHLEY*

One of the distinctive differences between Aves and Mammalia is the type of body covering. Man's age-old yearning for natural flight will probably never be realized due to the vast structural dissimilarity between hair and feathers. While segmentation of a single hair reveals a wonder of engineering design and skill, it is relatively simple compared to the complexity of a feather.

In our effort to explore the origin of this fantasy of feathers, it was perhaps significant that the literature revealed a surprising dearth of information regarding the source of the birds finery, or its faculty for flight. We read of feeble and somewhat incoherent speculations regarding supposed adaptations from the scales of prehistoric lizards, but the fossil record failed to accommodate the assumption with any transitional forms; nor was there offered any other apologia more tangible than the desperation of evolutionary theory.

And it is here that some interesting speculations seem to be in order. In attempting to fulfill their mission of evolutionary development, it has been convenient for Darwinists to minimize the importance of some of their problems. Yet just one problem may invalidate an entire theoretical edifice.

While modern evolutionary concept abhors and rejects any teleological connotations, it is difficult to imagine complexity without purpose, or function without guidance. Yet these anomalies are many times unwittingly admitted as certain forms are said to appear through "developmental pressure" or by some vague direction of "Nature."

The attribute of purpose in feather design can hardly be denied, just by the very nature of its use. That this purpose demonstrates objective function as well as compelling charm is forcibly confirmed by the elegance of pattern seen in the Cover Illustration. That this purpose involves complexity is readily appreciated as the microscope reveals the intricate structure of the feather's interlocking barbs and shafts observed in Figure 1.

While contemplating on the possibilities of chance development in such an intriguing device as a feather, we are arrested by several plaguing questions: Why should such an organ have arisen in the first place? It is evident that flight is not necessary for a birds survival as seen in the



Figure 1. Photomicrograph of feather detail reveals intricate interlacing or barbs to provide greater cohesiveness and aerodynamic stability.

penguin and the ostrich. On the other hand, feathers are not necessary for flight, as shown by the superb aeronautics of the bat. Complexity is supposed to arise from necessity; why should feathers and flight develop if there is no need for them?

Incidentally, the superlative maneuverability of the bat not only precludes the need for plumage, but since the classical geologic column indicates that the mammals appeared later than the birds, in a ludicrous moment we are tempted to suggest a development from the complex to the simple. Did feathers degenerate to hair? Would it be too facetious to ask if birds learned to fly because they had feathers, or did they grow feathers because they wanted to fly? Or was this complication of barbs, barbules and barbicels just one of the capricious whims of "Nature?"

These questions cannot be dismissed casually when one considers the necessity of experimental and intermediate forms (for which no evidence exists) or the demands of survival and selection which must be met if evolutionary development is considered. If feathers and flight were requisite for perpetuation, how did birds survive until the proper combination of plume and pinion was formed?

It must be admitted that there are many unanswered questions to every concept, yet the dual witness of functional design and purpose offer striking testimony and credence to the stately pronouncement of Gen. 1:21, "And God created . . . every winged fowl after its kind; and God saw that it was good."

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THREE LEVELS OF ANTHROPOLOGICAL OBJECTION TO EVOLUTION

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Anthropologists disagree among themselves about any particular application of evolutionary explanation. Yet they tend to accept without question the general idea of evolution. The data of evolution can be shown to be either borrowed or generated by the assumptions. The uniformitarian assumptions of an existent order can be shown to be inconsistent with an attempt to explain the origins of that order. Evolution succeeds only in deifying nature by placing within it the inscrutable mystery which is beyond science and the human mind. Its deifying treatment of material nature is a value position and not a scientific theory.

For good reason many people, laymen and professionals, have identified anthropology with evolution. To speak of anthropological objections to evolution will sound to many persons like scientific objections to science. What is more generally expected is religious or Biblical objections to evolution. Unfortunately, all too many of the religious objections to evolution have been based more in human emotions and traditions than in the Scriptures and as a result have generated far more heat than light.

If I seem incongruous or presumptuous to some in presenting anthropological objections to evolution, I would ask the reader to consider the following two facts about anthropology and anthropologists.

First, that while almost no anthropologist questions evolution, there is no particular evolutionary explanation offered by one anthropologist that is not opposed by some others. This is true in both physical and cultural anthropology.

The second observation is that, in the first three decades of the twentieth century, many cultural anthropologists of the United States and many social anthropologists of Great Britain either opposed evolution or did not regard it as a useful framework of explanation. Leslie White¹ says of this period, "... an important turn of events took place in anthropological circles: a vigorous reaction against evolutionist theory set in. In America this movement was led by Franz Boas." We see then that objections to evolution in general and to any specific evolutionary explanation is and has been registered from within anthropology.

It must be recognized, however, that the framework of evolution is today increasingly the "vogue" within anthropology. White's work is a strong reaction against the anti-evolutionary reaction of the first part of this century. His work in a context of many other factors has greatly minimized, if not eliminated, the anti-evolutionary direction of anthropology today. In fact, explicit overt opposition to evolution is most liable to be met by suspicions of the individual's ignorance of the data, of biased or uneducated

reasoning, or of a superstitious opposition to science.

And yet, it is on these three levels that I wish to raise what I hope to show are anthropological objections to evolution. These objections are anthropological because:

(1) They are openly concerned with the problem of data;

(2) They are consciously concerned with the exercise of reason;

(3) They are committed to the scientific criteria of theory.

I shall use a cultural anthropologist's definition of evolution as applicable also to biological phenomena: "Evolution may be defined as a temporal sequence of forms: one form grows out of another; culture advances from one stage to another."² Evolution also attempts to link the stages of the nonliving to the stages of life. The stages of life are also linked to the stages of culture. The whole process is used to account supposedly for the existing order of nature and man.

Two other concepts that are basic to the understanding of my objections are found in the adjectives: synchronic and diachronic. **Synchronic** has reference to a continuing order of phenomena. This is the approach of natural scientists by which the same regularities which are observed today, probably occurred yesterday and will occur tomorrow. $\text{HCl} + \text{NaOH} \longrightarrow \text{H}_2\text{O} + \text{NaCl}$ is a chemical change which was true one hundred years ago and may be expected to be true one hundred years hence. Time, we observe, is not a factor even though it is involved in the process. The synchronic approach then is an approach to an existent predictable order.

Diachronic has reference to temporal processes. It is the approach of historians to change in the state or organization of orders. The amount of salt or salts in the oceans is observed to change over time. The history of this change is a diachronic approach and is concerned with the past of the present state of the existing order, but not necessarily a change in the underlying order itself.

(1) Data

My objection to evolution on the level of scientific observation is that there are no data.

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This, I am aware, is an extreme statement. Perhaps I would receive more credulous attention if I were to say, as does T. A. Goudge³ in *The Ascent of Life*, that "The evidence is fragmentary." But in doing so I would only be following a common pattern of uncritical thought. However, in taking the more radical position, I wish to be understood only in terms of the support which I shall develop for it.

First, the fragmentary data that have been used in evolutionary works are the data of a synchronic order and not of a diachronic process. To take the categories of the existing synchronic order of life and make them into a model for the process of change of each one of these categories; and, then, to place the fragmentary fossil remains into these categories does not thereby transform these fossils into diachronic data.

A former paleontologist at California State College in Long Beach told me of an open cliff where layers supposedly contained millions of years of the evolutionary sequence of life. However, he said that there is absolutely no evidence of transition from one layer to the next. This was puzzling to him. His explanation was that each form *must* have entered from somewhere else. In other words, evolution *must* have occurred somewhere else.

Some may say, "How do you know it didn't?" The point is however, "How do you know it did in the absence of data?" The data of evolution must be transitional data otherwise there are only the data of an existent or synchronic order.

This leads to a second observation regarding the absence of data, and that is data are generated by means of the evolutionary model rather than generalized from data. In their imagination, men assume and fill in what the model requires, rather than use the model to explain what is observed. The generation of data occurs in a number of ways. For example, in two sentences White⁴ leaps from assumption to fact:

If we *assume*, as many authorities do, that culture began a million years ago, and if we date the beginning of agriculture at about 10,000 years ago, then the human energy stage of cultural development comprises some ninety-nine percent of culture history thus far. This *fact* is as significant as it is remarkable.

Probability is another technique for generating historical or diachronic data. After observing theoretical positions in the synchronic data of endogamy and exogamy White⁵ steps out on the course of time: "We may now undertake to sketch the *probable* source of development of human society in its earliest stages from the standpoint of endogamy."

Still further, "would be" data are called upon to substitute for the absence of observed data.

Such statements as the following are frequently made in the course of attempts to explain the supposed evolutionary origins of human society:

We might assume, therefore, that the tendency of mother and son to unite sexually *would be* greater than the tendency of the father and daughter. . . . a mother-son union *would be* less effective as an organization for self-defense, food getting, and reproduction than a father-daughter union.⁶

As good as this reasoning is, and as important as reason is, as we shall emphasize later, its use to supply the lack of data is only a testimony to its absence.

Evolutionary physical anthropologists can see how anthropologists of a half century ago used the model to create their data. Brace and Montague point out that Neanderthal man was given many gorilla like characteristics because this served to illustrate a stage of evolution. It is now known that he had shorter arms instead of the long ape like arms and that he was not stooped. Furthermore, the ferocious beast-like evolving temperament that he was supposed to have as a cave man is unlike the gorilla that supplied the link in the evolutionary sequence. Brace and Montague state regarding this fictitious datum:

More than just residues of this libel remain today in casual conversation, in the standard newspaper cartoon portrayal, in numerous popular books on science and even in professional circles where it should have long since disappeared.⁷

Errors of a generation or two ago are readily recognizable; nevertheless, they are repeated in the more sophisticated light of today.

A few select statements, not taken out of context, from Ross clearly outline the "generating power" of the evolutionary model when limited to synchronic data. Emphases have been added:

When one realizes that all chemical matter in the universe . . . started as the simple gas hydrogen, and that life on earth is the most complex known system of extremely complex chemical molecules, *it is obvious that somewhere and sometime in the past there was a transition* from simple chemical organization of the primeval universe to the complex chemical organization that is life. That life did originate we know, because the earth is now populated by living beings. . . . *There seems little doubt* that these elementary ingredients of pre-life somehow came together in cell-like spherules and formed some sort of protein-nucleic acid system. . . . *it is reasonable to assume* that eventually one of these highly advanced spherules changed in such a manner that it did two things: (1)

When it reached a certain chemical composition, it divided into two daughter spherules; and (2) each daughter spherule had the same chemical properties as the "young" parent spherule and repeated the process. *At this point a spherule had almost imperceptibly become an organism.* True life had come into existence.⁸

Here the synchronic data of an existing order plus human imagination yields the missing diachronic data. What are not *observed* as data become *obvious* from the evolutionary model.

A third point supporting the objection that evolution has no data is that there are evolutionary anthropologists who either in a limited or indirect way recognize this fact. Wm. Howells admits the absence of data in any line leading to living man,

Where did *Homo Erectus* go? The paths are simply untraced. . . . This is a period lacking useful evidence. Above all, the nature of the line leading to living man—*Homo Sapiens* in this Linnaean sense—remains a matter of pure theory.⁹

Leslie White's admission that evolution is without empirical data is more indirect and perhaps unintended. This is found in the manner in which he differentiates evolution from a synchronic structural-functional science and from the diachronic phenomena of history. White says that the structural-functional approach of natural scientists is a generalization of the data of a synchronic order. Historians, however, treat the particular events or data of diachronic phenomena and do not generalize. Evolutionists generalize in terms of the temporal or diachronic order. However, they do not generalize from particular cultures nor the particular events of particular cultures.

Evolutionists then are left without the data of the synchronic order of natural science and without the temporal data of history. The result is a philosophy that is not grounded in the empirical world.

A final testimony to the absence of data comes from an effort to overcome this deficiency. Francis J. Ryan, writing in *Scientific American*, claims that "there is plenty of evidence for evolution, but it has been extremely difficult to study the process in the laboratory."¹⁰ "The reason," Ryan says, "is that evolution is exasperatingly slow. Man today differs little biologically from the man of Ur 5,000 years ago. Almost nowhere in nature can we see evolution in action."¹¹

But where then is the evidence or data? Ryan's opening statement gives us the key. "Our ideas about evolution today, nearly 100 years after Charles Darwin launched his immensely fruit-

ful concept, are still based largely on observation and deduction rather than on experiment."¹² In other words, in the absence of processual or diachronic data, the data of a synchronic order from different points in time are arranged by deduction into the diachronic framework of evolution.

Ryan suggests that the process of evolution may be studied in bacteria which take only twenty minutes to produce one generation, whereas it takes twenty years in human beings. Thus in two years bacteria can pass through more generations than man could in 1,000,000 years.

A case is built on the observation that due to random mutations a penicillin resistant bacterium is produced when penicillin has been introduced. This is indeed a case for mutation in inherited characteristics and of natural selection but the end product is not evolution. Bacteria are still bacteria and the generations of hundreds of years have not produced anything else.

(2) Reason and Logic

My second anthropological objection to evolution is that it is inherently irrational. Evolutionists frequently raise the charge of irrational against those who oppose them. By implication Goudge does this when he says, "No reasonable person acquainted with the evidence can doubt that man is a product of evolution."¹³ I have shown that there is no evidence for the diachronic process of evolution and I will now attempt to show that the idea of evolution violates the demands of reason.

First, the core of an irrational characteristic is found in the attempt to apply the principle of uniformitarianism of the synchronic approach of science to the evolutionary explanation of diachronic or temporal phenomena. A clear statement of the principle of uniformitarianism is found in Berry's *Growth of a Prehistoric Time Scale*: ". . . natural processes and functions observable today have been going on in the same basic manner throughout past time."¹⁴ Goudge describes this application without recognizing the irrational problem:

Another example . . . is the "uniformitarian principle" . . . Its function is to make possible the extrapolation backwards in time of results obtained from the investigation of present-day organisms. The principle states, roughly that factors and laws now discovered to be operative in the biological domain were operative throughout all or most of the history of life. An evolutionist has to espouse this principle if he is to employ the findings of sciences such as genetics to construct systematic explanations of the phenomena of the remote past. If he did not espouse it, his

theory would fail to work. But again, the situation has to be understood in more than instrumental terms. For the doctrine of evolution would fail to be intelligible unless the uniformitarian principle describes what is the case. It must be true that biological factors and laws now known to be operative were at work in the past. This is a statement incapable of being proved within evolutionary theory, because it functions as a metaphysical presupposition of that theory.¹⁵

Assumptions and metaphysical presuppositions are not to be discredited as such. They constitute a necessary part of the development of all scientific knowledge. The irrational factor is found when the necessary metaphysical presupposition is found to be incongruous with the theory itself.

The synchronic principle of uniformitarianism involves the concept that events in nature of the past, present, and future take place uniformly. Without this assumption the universe would be capricious and scientists could make no generalizations.

However, when this assumption is used in a diachronic explanation of how things came to be, it becomes inherently inconsistent, for to do so involves the assumption that things in the past took place as things are now observed when the things now observed were not yet existent. Evolutionists assume that at least some of the regularities of the present did not exist in the past, while they use the uniformitarian principle as if all things in the past took place according to the regularities now observed.

To make our reasoning more specific, evolutionists assume that at one time the phenomena of man did not exist; therefore, things in the past were not taking place in terms of this phenomena. On the other hand, phenomena that now exist were operating to bring man into existence, even though such phenomena are not observed to be doing that now.

To go further down the evolutionary scale, evolutionists would assume that the biological regularities now operating were at one time not operating because they were not yet in existence, so again all things in the past were not occurring according to the regularities now observed, except of course the regularities of inorganic nature. However, these were operating but not according to processes now observed as occurring today since they were operating to produce life.

But suppose we push the evolutionary scale to a logical or reasonable conclusion and ask for the origins of the inorganic? At this point *none* of the processes we now observe would be in operation. At this point the assumptions of uniformitarianism which evolutionists have pre-

empted as a metaphysical presupposition, would be totally eliminated by the diachronic assumptions of evolution itself. Evolutionists therefore in order to use the synchronically sound principle of uniformitarianism must make two rationally unsupportable decisions:

(1) What part of the now observable regularities of nature operated in the past to bring all of the other regularities into existence. Even here these regularities are asked to do what they are not now doing and hence are a violation of the principle of uniformitarianism.

(2) How far the uniformitarian assumption will be pushed before it is totally denied.

The incongruence of the principle of uniformitarianism with evolution focuses our attention on the transition involved between the three major categories of (a) matter, (b) life, and (c) culture. Kroeber and many anthropologists since have referred to these categories as the inorganic, the organic, and the superorganic. We have shown that transitional data within the subdivisions of these categories are absent.

Supposed transition from one category to another has called forth a tremendous exercise of the imagination. As stated earlier, imaginative and speculative thought is not to be discredited merely because it is speculation. It is the irrational character of this speculation that forms a basis for objection.

(a) Matter

The problem of the origin of the first category of matter has produced a wide range of responses that cannot meet the criteria of rationality. I shall list three merely to illustrate:

(1) The big bang theory in which a big concentrated molecule of pre-universe matter explodes to produce the present ordered universe of matter.

(2) The universe of matter is a product of a primordial dust cloud which was presumably matter.

(3) The position that is most rational of the three in which the theorist rationally gives up on this problem as beyond the reasoning powers of man.

Yet, all of these as well as the steady state and the cyclical theories fundamentally give to us an eternally existent matter and therefore deny the origins which they attempt to explain. In them the god of materialism is obviously inherent.

But how can one rationally account for the beginning of life or man at any point in time from an eternally existent matter? How could it eternally exist without producing life and then at some point in time do what it had not for an eternity? Perhaps an eternity of cycles in which

universes and man have come and gone is the only consistent answer.

(b) Life

The problem of evolving from matter to life may not be quite so frustrating to speculative thought, but it is not without an irrational character. In a recently televised National Geographic documentary the viewers were told without any implication of doubt that at some time in the dim distant past two giant molecules came together and became reproducing. Life, which is dependent upon a genetic code for its reproduction, and which alone produces the genetic code, is presented as coming into existence by a fortuitous congruence of the material constituents of life. I am not a biologist, but the arguments presented against this by Dr. Duane Gish have been rationally convincing to me.¹⁶

However, I would like to illustrate the irrationality of evolution at this point by referring to another biologist, George Wald. In the August, 1954 issue of the *Scientific American*, Wald presents his reasoning in an article entitled, "The Origin of Life." Here Wald presents the modern scientific evidence as established by Pasteur and others against the spontaneous generation of life.

He then shows how the complexity of the phenomena of life places it beyond the imagination to think that it could have arisen from the non-living by chance. Upon which he then announces, "Yet here we are—as a result, I believe, of spontaneous generation."¹⁷ His reason for his faith is that he refuses to accept the only alternative. Wald gives his rationale:

The reasonable view was to believe in spontaneous generation; the only alternative, to believe in a single, primary act of supernatural creation. There is no third position. For this reason many scientists a century ago chose to regard the belief in spontaneous generation as a philosophical necessity. . . . Most modern biologists, having viewed with satisfaction the downfall of the spontaneous generation hypothesis, yet unwilling to accept the alternative belief in special creation, are left with nothing.¹⁸

At least the rationality of this choice of faith is not demonstrated. However, its irrational character is found in its defense.

Wald begins by *assuming* "with every event one can associate a probability."¹⁹ He uses as his model of events the flipping of a coin. This is however an observable, repeatable event. The spontaneous generation of life is not however of this nature; in fact, it has not even been established by Wald at this point in his argument as being an event.

Yet, he goes on to reason that no matter how small the chances of an event occurring, it is increased by the number of trials or time involved. If the chances are only one in a billion for an event occurring in one year, it would be almost a certainty for it to occur in a billion years. However, Wald does all of this without establishing the chance of spontaneous generation occurring in one year or a billion years. The clue to the irrational position is that there is *no* establishable probability for this event in any length of time. And zero multiplied by any number of years is still zero.

(c) Culture

Finally, the attempt to speculate on the transition from precultural life to culture or from lower animal to man is fraught with the same irrational character. White says of the origin of culture,

We may assume that culture came into being in the following way: Neurological evolution in a certain line, or lines, of anthropoids culminated eventually in the ability to symbol. The exercise of this ability brought culture into existence and then perpetuated it.²⁰

Yet, man today with these faculties is dependent upon association with others having language and culture not only to survive, but to learn a language and the associated culture. White would tell us that man possessing the symboling faculty without culture created culture, and then he holds that it is culture that determines man and that man cannot even modify culture much less create it.

It is this kind of irrational "bind" that speculative thinkers are caught in whenever they attempt to use the synchronic principle of uniformitarianism for an evolutionary effort to link the three major categories of matter, life, and culture.

(3) Theory

My third anthropological objection to evolution is that it is not scientific theory. This partially rests upon the first two objections registered. If there are no data to explain, evolution can hardly be a scientific theory. If evolution is used to generate data rather than explain, it can hardly be given the status of science. Because data are generated rather than explained by means of evolution, then evolution is not subject to falsification or scientific test.

Darwin's ideas were not a verification of a scientific hypothesis. Nor has evolution ever been tested since it is not like scientific theories that are supported, modified, or discarded in the ongoing process of scientific investigation. That

evolution should be subject to questioning is regarded more as an heresy than as a heuristic procedure of science.

Finally, I wish to support the position that evolution is not a scientific theory because it is instead a structure of values. First, evolution is a structure of values because it is a time perspective. The way men in all cultures order their lives is in accordance with the way they look into the past, and into the future, and focus these on the alternatives of the present. By evolution men supposedly gain a past that goes beyond their practical imagination to the nonrational amoral realm of the lower animals. Evolutionists have little but uncertainty to offer for the future of the race; and, to the individual, nothing beyond death. It is more than a correlation that the moral orders of modern societies are crumbling as the time perspective of evolution is put, more and more, into the position of unquestionable dominance in the minds of men.

Secondly, evolution is a value because adherents locate the absolute in material nature. The materialistic deity of evolution, though unknown, is pointed to in a statement by George G. Simpson:

The ultimate mystery is beyond the reach of scientific investigation, and probably of the human mind. There is neither need nor excuse for postulation of nonmaterial intervention in the origin of life, the rise of man, or any other part of the long history of the material cosmos. Yet, the origin of that cosmos and the causal principles of its history remain unexplained and inaccessible to science. Here is hidden the first cause sought by theology and philosophy. The first cause is not known and I suspect it never will be known to living man. We may, if we are so inclined, worship it in our own ways, but we certainly do not comprehend it.²¹

This undiscoverable absolute, hidden in the existence of matter, beyond the reach of science, is the position of a deity and hence of absolute values.

Finally, evolution is a value system because proponents make value claims upon man. Simpson realizes that evolution leaves man with a need for an ethic, and yet the survival of the fittest mechanism of evolution is hardly a suitable basis for human ethics. He finally arrives at the conclusion that since the amoral process of evolution produced the moral and rational creature called man, man is obligated to obtain this knowledge and to make it known to others. The object of this moral obligation is necessarily limited to fellow human beings since it is difficult to see the basis of a moral obligation to an amoral process.

However this may be, what we have is not a scientific theory, but an aspect of social relationships attempting to give some sense of moral direction to man. Direction is desperately needed. But it is not convincingly clear how the knowledge that my existence as a moral being is a product of an amoral process called evolution, can give to me a sense of moral direction. Neither is it clear how witnessing to that process constitutes moral direction. This last statement is not however presented as an anthropological objection. It might, however, be listed as an objection of applied anthropology because its cultural ineffectiveness is obvious.

Summation

In summary, as an anthropologist, I object to evolution on the anthropological grounds that I have presented. There are no data for evolution. Proponents use the idea of evolution to create or generate data by appropriating the synchronic data of science in an effort to use that very synchronic order to explain how it came into existence. The process of using synchronic categories of nature as a model of the diachronic development of that order is an inherently irrational process.

All of the categories of matter, life, and culture indeed have a past and their history as far as discoverable takes us into that past. However, neither data nor reason justify the arrangement of fossil apes and fossil men in a sequence of development from ape to man.

And finally, the attempt to get at origins through nonobserved temporal processes produces only a value structure, not scientific theory. As such, ultimate origins are never reached. Instead, adherents attempt to find an absolute hidden in an amoral eternal material existence.

Deification of matter is not to be confused with the metaphysical foundations of the scientific investigation of matter. The scientific study of the existing order of creation must necessarily be kept distinct from any consideration of how that order came to be. In attempting to ignore this necessary distinction, evolutionists follow an irrational approach to data that are products of their own speculation resulting in a value structure rather than scientific theory.

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THE CAUSE OF THE ICE AGE*

REGINALD DALY**

It is shown that there has been only one ice age and that the theories of multiple ice ages are misinterpretations based for the most part on index fossils. Carbon-14 dating and the recession of Niagara Falls are used to demonstrate that the ice age is an extremely recent event. Evidence is presented to show that the ice age was caused by, and that it followed the universal flood. Evaporation of floodwaters cooled the atmosphere below the freezing point. It is proposed that melting of an Arctic icecap that floated northward in the floodwaters lowered the temperature of the ocean from 25° C. almost to zero. Just as evaporation is a cooling process, so is freezing a "heating" process which automatically brought on the postdiluvian "Climatic Optimum" which raised world temperatures 5° above "normal" after the ice age.

Introduction

Many conflicting theories have been proposed to explain the origin of the ice age. There is no need, however, for the pessimism expressed by Robin.¹ It is my conviction that an Ice Age would be expected to follow a universal flood. The areas now deserts were "soaking wet" for centuries following the flood. There were lakes everywhere; in fact, as shown by Lammerts,² vast lakes existed in the San Joaquin valley as late as 1870.

Evaporation kept the humidity at 100% most of the time. The earth was thus a new-style refrigerator—a modern evaporator type. For evaporation is a cooling process and if there is enough evaporation, and it is rapid enough, then it is a *freezing process*. Every cubic centimeter of evaporating water cools the atmosphere by 540 calories. Water vapor was rising from what now are deserts, from thousands of lakes, and from greatly enlarged oceans.

Thus, it could be said, from this point of view, that the earth was an ultra-modern dual-style

refrigerator with two kinds of refrigeration operating simultaneously. Freezing cold evaporation clouds were rising everywhere, resulting in rainfall in the tropical areas and snowfall in the temperate zones, and cold winds were flowing across the resulting snow and ice fields pouring continuous snowfall on the adjoining shore lands.

Thus moisture laden supersaturated clouds were carried by wind currents to northern Canada, Scotland, Norway, and Sweden where snow fell daily from November to April, accumulating to depths of 500 to 1,000 feet during the first winter. One hundred years of such snowfall results in about 50,000 feet of ice—the glacial age. The tops of these ice mountains, a mile high, would be so cold that snow would continue to pile up all spring and early fall as well as in the winter. Very little would melt in the cold July and August summer. The result would be cumulative, the higher the mountain, the colder the temperature and the greater the snowfall or ice particle fall. The weight of such ice would cause it to flow outward across the Baltic Sea, depositing boulders all across the north German plains, as we find them today.

Such in general is my concept of how the glacial age was the inevitable result of a world wide flood. Now let us see how well the facts, as we know them, about the surface of the earth,

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especially evidence of glaciation, can be explained by this generalized concept.

Monoglacial Theory Replaces the Multiglacial

Most geologists teach that several ice ages occurred but actually there is very little evidence of a second, third or fourth ice age. An increasing number of geologists are discarding the multi-glacial theory and are adopting the monoglacial theory. "Deposits formerly attributed to four or five separate Pleistocene glaciations are deposits of a single glaciation."³

But someone may ask, how can a 5,000-years-ago flood explain a 500,000,000-years-ago ice age in the Cambrian? For J. H. F. Umbgrove⁴ states that *no less than six ice ages are known from the Precambrian*. And E. T. Brewster writes of a "Precambrian or Lower Cambrian" ice age: "In China in the latitude of northern Florida, there are 175 feet of obvious glacial till, scratched boulders and all, and over it lie sea-floor muds containing lower Cambrian trilobites, the whole now altered to hard rock."⁵

Notice that word "trilobites" in the last sentence. The whole theory of a Cambrian ice age with its 500,000,000-year date is based on these trilobites. Trilobites are used as index fossils of the Cambrian and later Paleozoic Age and rocks are dated accordingly. So each place the flood buried trilobites along with glacial till is labeled Cambrian and becomes one of the Cambrian or if not present Precambrian ice ages, 500,000,000 years old or more, merely because a lot of little fossil creatures, ¼ inch to 30 inches long resembling pill bugs in many ways, and softbodied invertebrates without backbones are said to have evolved 500,000,000 years ago.

And an ice age in Antarctica is said to be 60,000,000 years ago because some fossil sea shells are thought to have "evolved" 60,000,000 years ago and are therefore said to be index fossils of the Eocene! As George McCready Price has said, this logic "has all the infirmity of the Middle Ages" and ought to have been purged out of science long ago.

As might be expected, any science built on ice ages involving such theories of evolving fossils will fall into hopeless confusion. As J. K. Charlesworth of Queen's University, Belfast, frankly admits, "The cause of all these changes, one of the greatest riddles in geological history, remains unsolved, despite the endeavors of generations of astronomers, biologists, geologists, meteorologists and physicists it still eludes us."⁶

Did the Continent of Africa Drift Down from the North Pole, or Up from the South Pole?

In Africa geologists have discovered a lot of so-called "glacial till" and "striae" which they interpreted as a Permian ice age in the hot tropics.

But as Ernst J. Opik admits, "How this could happen in a region which at present is within the tropics stretching from 17° to 24° north latitude, is one of the greatest geological puzzles we are confronted with."⁷

The mystery of glaciers in the hot tropics, near sea level, is explained by Alfred Wegener and his followers by the theory that the continents drifted slowly, like rafts on the sea, and that this part of Africa was once in the Antarctic where it developed glaciers. Supposedly, after many millions of years in Antarctic regions it drifted slowly up to the tropics and was somehow united with the rest of Africa, parts of which must have remained in warmer regions as they show no evidence of glaciers.

Continental drift is a controversial question and it will not be our task in this paper to consider the evidence relating to it. Certain puzzling features, such as glacial striae in the tropics and fossil forests and coal swamps in Antarctica, present an interesting challenge. Some scientists have attempted to meet this challenge by proposing continental drift and/or wandering of the poles. But flood geologists do not have to imagine huge continents floating around like rafts on a big ocean in order to explain coal beds. They merely imagine floating trees which piled up on hills, in alcoves or basins and became covered with floodwater mud to form coal.

But how could ice invade tropical regions in the flood? Is not ice lighter than water? Will it not float? So when Antarctica's icecap was covered with a mile or two of floodwater might not the icecap bob up to the surface and float away as the biggest iceberg of all time, and Greenland's icecap the world's second biggest iceberg?

There is a certain amount of factual evidence supporting this theory. There is evidence that there were no icecaps at the time the sedimentary rocks and coal beds were laid down. "Indeed it seems doubtful whether even the polar icecaps existed then."⁸ Charles H. Hapgood writes, "I have suggested that in very recent times, no more than 10,000 years ago, a large part of Antarctica may have been ice-free."⁹ Swinnerton writes about where the icecap floated, and where it melted, in this highly interesting passage:

A strikingly different picture is outlined by the Lower Cretaceous rocks of Central Australia. There some of the layers contain large erratic blocks which could only have been transported to, and dropped in, their present position by icebergs drifting into the seas where the original sediments were being laid down.¹⁰

If anyone suggests that ordinary icebergs dropped these large erratic blocks, such an idea may be refuted by simply looking at a map of

Australia and noting the dotted line marked "Northern limit of drifting ice." No ordinary-sized iceberg ever gets past this limit and if an iceberg did it would merely be cast up on the shore and melt, and never get into "central Australia." But Swinnerton imagines a highly extraordinary iceberg for he says that the "icebergs," "transported to and dropped in," "central Australia," "large erratic blocks," "where the original sediments were being laid down."¹¹

The largest of these blocks is the "Ayers Rock." It is the world's most spectacular erratic boulder. "Ayers Rock, in the Northern Territory, is the largest single rock in the world. It is dark red, especially red at sunset."¹² It is 2¼ miles long, by 1¼ miles wide, with a height of 1143 feet showing above the ground. It is called "The Red Heart of Central Australia" because it is composed of red rock, shaped somewhat like a heart, and located at the heart of the continent near the geographical center of Australia.

There are no nearby mountains from which it could have been derived. But there it is, out in the desert with the sagebrush and the cactus, a huge monolith for which modern geologists can furnish no explanation. No ordinary-sized iceberg, such as Swinnerton's theory seems to suggest, could possibly transport such a colossal block of rock 2¼ miles in length.

But the proposed antarctic icecap itself, or a sizeable portion of it, could lift such an enormous weight, and the universal flood could float it into the middle of Australia and drop it down. Swinnerton adds these significant words: "Other layers yield fossilized logs of conifer trunks which must have grown under much less severe conditions than those reflected by the presence of icebergs."¹³ The uprooted trees, the icebergs and the Ayers Rock must have been rafted in from somewhere, as neither the rock nor the conifers, and certainly not the icebergs, are native to Central Australia.

Now it's scarcely likely that the Antarctic icecap floated off northward and melted in Australia in one piece. There is an interesting clue which indicates that part of it probably floated to and melted in Africa. After considerable research and field work on ice ages in Africa, the Canadian glaciologist, A. P. Coleman, produced evidence that a continental ice sheet—not just icebergs, but an icecap—once invaded Africa from the sea.¹⁴ According to Holmes, ice from the sea from the direction of Antarctica, invaded the southern tip of Africa, flowing directly northward.¹⁵

Continental Ice Sheet Flowed Northward Across India

Ice scratches on the rocks of India show that ice moved *from the south toward the north*, in a

direction away from the equator, as far as the Salt Range of Pakistan. This is an insoluble enigma to modern geologists, for *ice from the equator, flowing northward* cannot be fitted into any of their theories. But in keeping with flood geology huge icebergs from the Antarctic icecap may have floated over India *from the south* and scraped along over the rocks as far as the Salt Range, almost to the foothills of the Himalayas.

As to where Greenland's icecap floated and melted, we know at least that today's icebergs break off and float southward in the North Atlantic, cooling off the surrounding climate as they melt. If Greenland's ice age icecap broke up into thousands of icebergs, turning the northern half of the Atlantic into a half-freezing, half-melting ocean of floating ice—that would be sufficient to explain why icecaps developed in the adjoining areas of northwestern Europe and northeastern North America.

Some Greenland icebergs may be the ones that L. Dudley Stamp says got washed up and stranded on the English shoreline, although he writes "that the boulders were carried . . . through the agency of icebergs broken off from the Irish Sea ice where it terminated between the coast of Wales and Ireland."¹⁶ W. L. Stokes writes that the sea between Greenland and Iceland "had been a mass of floating pack ice."¹⁷

Freezing-cold winds that blew across this ice field of floating pack ice and poured snow on the Highlands of Scotland would be sufficient to explain the British and Norwegian icecaps. Apparently there was no Gulf Stream at that time or it would have melted this "mass of floating pack ice." With "pack ice" replacing the Gulf Stream, northwestern Europe entered its ice age. Ice reflects sunlight: 75% of the light and heat arriving from the sun was reflected into space.

Not only did Greenland's icecap scatter icebergs over the Atlantic from Greenland to Cuba but Arctic pack ice floated through, or rather over, Bering Strait so that "From Alaska to Lower California, and from Greenland to Cuba, the oceans were crowded with icebergs."¹⁸ Thus in the flood view the Arctic mass of ice floated south, bringing the ice age with it and refrigerating America and Europe in the ocean of melting-freezing icebergs.

Arthur Holmes of the University of Edinburgh writes, ". . . that part of the ocean must have been frozen over or effectively covered with pack ice as far south as British latitudes, and much farther south on the American side."¹⁹ He states that the temperature of the world's oceans dropped from 25° C. to nearly 0° C., (or from 77° Fahrenheit, almost to freezing).

Holmes attributes the cooling of the oceans to vast quantities of melting ice. But he cannot conceive of any source from which the first ice

came, to get the ice age started. The floating ice-cap theory solves this problem by floating the Antarctic icecap out under the warm sun, thereby making the oceans a melting-freezing mixture, and explaining the drastic temperature drop from 77° Fahrenheit, or from 25° C. as stated by Holmes, almost to the freezing point.

From the south pole there is only one direction that ice may float, and that is north into warmer waters. If the 6,000,000 or 10,000,000 cubic miles of Antarctic icecap broke up into millions of floating, melting icebergs, each one a cubic mile or so in volume, that would be enough to turn the earth into an enormous old-style icebox, cold enough to explain the ice age many times over.

The real problem is not how to explain "the great ice sheet that covered most of India," but why it did not cover *all* of India. Or to put the problem in sharpest focus, why, as Coleman asks, "these ice sheets were distributed in what seemed a capricious manner? Siberia, now including some of the coldest parts of the world, was not covered, and the same is true of most of Alaska, and the Yukon territory in Canada."²⁰

Why No Ice Age Glaciers in Siberia?

Let's start first with northern Siberia, the "coldest spot on earth." It is a lowlying plain at such a low altitude that it was covered with water during the larger part of the ice age. No icecap can be formed on top of water, which is supported by the fact that the north pole, one of the coldest spots on earth, has only a few feet of floating ice; whereas Greenland, farther south, is capped with a mile-and-a-half-thick icecap on top of its 1600-foot-high rock base.

When Siberia finally did rise above the receding floodwaters all of the north pole's ice had floated off southward and melted, and all of Antarctica's ice had floated off northward and melted, because north is the only direction it could go, so that the earth was no longer an icebox-style refrigerator. Neither was it much of an evaporation-type refrigerator, because by this time all the continents had risen and partially dried up. The Ural Mountains intercepted most of the moisture-laden winds so that there was only a light winter snowfall which melted the following July, as Siberia always rises above the freezing point in July and August.

But the northern tip of Greenland, which is almost on top of the north pole, had no ice age glaciers, and some of those northern Canadian islands were also devoid of ice although they were much farther north than the north magnetic pole. Theorists often bypass this most baffling of all ice age puzzles. A. P. Coleman writes in his *Ice Ages Recent and Ancient* that the northern tip of Greenland, some of those farthest-north Canadian islands, north of the north magnetic

pole, and all the low-lying land of the Yukon and Alaska show no ice scratches on the rocks, no glacial till, or signs of ice age glaciation.²¹

There is no problem for the flood theory as all of these low-altitude lands were probably covered with water for the greater part of the ice age. And icecaps could not have been formed on top of water. Nothing could have formed but a few feet of floating ice—about 30 feet thick as at present in some places.

And if glaciers flowed down from the adjoining mountains, the icebergs would have merely broken off and floated away. By the time these low-altitude lands rose above the receding floodwaters, all of the Arctic ice would have floated off southward to help bring on the American and European ice ages.

So there was no icebox refrigeration effect to glaciare those Arctic areas and not so very much evaporation-type refrigeration because the continents were beginning to dry up. But someone will immediately object, "You surely do not mean to imply that there was no ice in Greenland or in all those northern Canadian islands?"

Of course there was ice there in process of formation, but it was new ice, freshly frozen, and the freezing of water is the opposite of the melting of ice. The freezing of all the postdiluvian ice was a warming process that brought on the warm "climatic optimum" that immediately followed the ice age.

It is difficult for some to grasp this concept that freezing is a "heating" process, that it returns 80 calories of heat to the atmosphere for every cubic centimeter of water frozen. It may help to print "heat" in quotes, which doesn't mean heat in the sense of hot summer weather, but "heat" in the sense of moderating the winter—that is, not so far below zero.

In this sense then, the northern tip of Greenland and the farthest-north islands of Canada, and a few Siberian islands, having been shielded from the severities of the ice age, were now "heated"—that is, the cold winters made less severe as they rose up through the protecting sheet of water in the last stages of the ice age just as this "heating" effect was beginning to bring in the warm "climatic optimum" that immediately followed the ice age.

Mystery of Ice Age in the Hot Tropics

But by contrast with these unglaciated islands of northern Canada and tip of northern Greenland, glaciologist A. P. Coleman speaks of the insoluble mystery of an icecap in the hot tropics, on the 2000-foot-high plateau of southern India. He writes that the icecap "extended 1100 miles to the Salt Range in the north."²² Of course it's an insoluble mystery, for no drifting continent or shifting crust theory can get India glaciated

at the north pole without shoving Asia up there ahead of it, or at the south pole without dragging Asia behind.

Arthur Holmes, and several other authors, solve this awkward problem by cutting off Arabia and India from the rest of Asia and placing India at the south pole, while leaving most of Asia farther north somewhere. In Figures 540, 874 and 875, he shows southern Africa, India, Australia and South America clustered around the south pole, becoming glaciated during the late Carboniferous, and in Figure 539 Holmes shows these four glaciated areas after having been carried by convection currents to their present locations.²³ Dr. Ronald Fraser writes,

Guided by convection currents in the mantle, the four continental masses of South America, Africa, India and Australia were scheduled to set sail from the heartland of Antarctica in Mid-Mesozoic times for their present anchorages: voyages of anything up to five or six thousand miles in the last two hundred million years, at a cruising speed of two or three centimetres a year.²⁴

Holmes asserts that India crossed the equator (after having been glaciated from the south). It then parted company with the Afro-Arabian block and continued moving northeastwards until "its hidden extension" plunged underneath and uplifted Tibet. But according to my theory India (also Arabia) was never at any time separated from Asia, nor was it ever located near the south pole, nor did it ever separate itself from Africa by floating across the Arabian Sea, nor did it ever perform the fantastic feat of plunging underneath the Himalayan Mountains and lifting up the plateau of Tibet, which Holmes suggests. An ice age in India is no problem for the flood-ice-age theorist with a billion tons of Antarctic icebergs floating around off shore in the Indian Ocean, and cooling evaporation rising from the nearby Indian Desert.

Also Coleman showed that icecaps reached sea level, within the tropics, on three continents: Asia, Africa and Australia, as well as "in the mountains of Peru, almost at the equator."²⁵

In order to explain these ice scratches in the tropics, Africa is said to have drifted over and around the south pole during the Permian, after which it drifted 5000 miles northward. It is no insuperable problem for the flood-ice-age theory to produce glaciers in tropical Africa, with a million Antarctic icebergs floating offshore. But without the flood theory as the key that unlocks the mysteries, the ice age is a confusing jumble of baffling mysteries.

Why the Hudson Bay Area Was the Generating Center

The most baffling puzzle of all is why Hudson Bay instead of British Columbia should be the generating center of the northern hemisphere's biggest icecap. The ice of the Hudson Bay area was built up a mile or two in depth, *sufficient to flow over the top of the Appalachian Mountains* down onto the Atlantic seaboard to Boston and across the Great Lakes almost as far south as the 37th parallel of latitude which runs through the northern tip of Africa.

Charles H. Hapgood tries to solve the problem by suggesting that "the Hudson Bay region lay at the pole" about 18,000 years ago and developed its icecap while it was up there, but as it is not up there now he suggests "a movement of the crust that would move North America southward about 2000 miles. . . ." "Beginning about 18,000 year ago and ending about 8000 years ago."²⁶

This would involve a movement of one thousand feet per year, or about a meter per day which is very much faster than the 3-centimeters-per-year speed at which South America, Africa and India drifted up from the south pole. This presents the continental drift theorists with an intolerable contradiction.

But the flood-ice-age theory as presently expounded can be used to explain the Hudson Bay puzzle quite naturally. (The reader will probably need an atlas during the discussion in this section.) Note first that the Arctic islands north of Canada are joined to the mainland, northwest of Hudson Bay by an isthmus around which is low-lying land. This low-lying isthmus may have been covered for centuries with the receding waters of the flood and *ice-cold waters from the frozen northwest Arctic Ocean poured across this isthmus* into Hudson Bay, and out again through Hudson Strait, filling the whole Bay area with ice water and turning eastern Canada into an Arctic region with sub-zero climate.

Central and eastern Canada rose into a block of ice, comparable to Antarctica. Moisture-laden winds, supersaturated with evaporating flood-water, poured down continuous snowfall, twelve months a year, that packed into a mile or two of ice that flowed *downhill* across the mountains to New York, and through and over the Great Lakes to St. Louis.

The current of ice-cold Arctic Ocean water flowed into Hudson Bay from the northwest and out again on the east side through Hudson Strait making an enlarged-volume, ice-cold Labrador current, with scattered Arctic icebergs, that may have driven the Gulf Stream off to the south and taken control of the North Atlantic. Then cold North Atlantic winds probably blew across this

ice field and poured sleet and snow over northwestern Europe, turning the British Isles, Norway and Sweden into blocks of ice.

A careful examination of the map of northern Canada will show a *very narrow channel*, near the north magnetic pole, through which ice-cold waters still flow from the northwest Arctic into Hudson Bay and out again in the Labrador Current. If the Canadian Government would block this narrow channel, which should not prove an impossible engineering feat, the temperature of Hudson Bay would rise still more and with it the temperature of eastern Canada, thereby permitting farming a little bit farther north and moderating to some extent those bitterly cold northern winters. The present-day channel can be thought of as an interesting relic of the flood and the ice age, the deepest part of the original channel.

As soon as the waters of the deluge had sufficiently subsided, the isthmus joining continental Canada with the Arctic islands rose through the receding waters, thereby blocking off the ice and ice water of the northwest Arctic. Hudson Bay then gradually rose to normal temperature. The Labrador Current dropped back to its present-day limited flow. The Gulf Stream once again took over the control of the North Atlantic and blew warm winds, melting Ireland's icecap in a few decades, with Sweden's and Canada's icecaps slowly melting in one or two milleniums.

Carbon dating shows that the ice had left northern Ontario 6380 years ago,²⁷ or about half or three-quarters this length of time if allowance is made for carbon dates being too old. A figure, *not based on carbon dating*, of less than 4000 years since the end of the ice age has been obtained from calculations concerning Niagara Falls. "Careful investigation by W. A. Johnston of the Niagara River bed disclosed that the present channel was cut by the falls less than 4000 years ago."²⁸ This figure of "less than 4000 years" can be fitted into flood chronology.

It is even possible, as shown by the following quotations, to fit the entire ice age into the post-diluvian epoch, including the build-up, duration, and the waning phases. H. E. Suess of the United States Geological Survey showed that some pieces of wood found in glacial till give a radiocarbon age of only 3300 years.²⁹ This establishes that the time since the death of the tree, including the time during which it was transported by the glacier, was close to only 3300 years.

The geologic suddenness of the final melting of the ice-sheet, proved by the brevity of existence of its attendant glacial lakes, presents scarcely less difficulty for explanation of its causes. . . .³⁰

As more and more radiocarbon dates are collected it becomes increasingly clear that the ice

age is such a recent event that it cannot be assigned to any earlier age. Heat arrives from the sun at the rate of two calories, per square centimeter, per minute, and a little arithmetic will show that a floating Antarctic icecap could be melted by the sun in a surprisingly short time.

Icebergs Floated Over Kentucky and Missouri

Richard J. Lougee of Clark University has stated, "Iceberg-rafterd erratic stones and boulders became grounded on the submerged topography of northern Kentucky, southwestern Missouri and eastern Iowa."³¹ At the time of those icebergs most of the United States was still under water, for Lougee maintained "that an immense ice-marginal body of water was formed, extending from Ohio to Montana and from the Gulf of Mexico to the Wisconsin driftless area." It covered "the whole area of the so-called Nebraskan, Kansan and Illinoian glaciations." And, "Reduction of the ice age to 'unity' shortens geologic history and nullifies the meaning of the terms Nebraskan, Kansan, Illinoian, Wisconsin and the several 'interglacials'."

Lougee referred to "driftwood and other organic material heretofore interpreted to be 'interglacial' deposits." The "driftwood," of course, was the floating floodwater debris, much of which settled in such places as Coal Valley, Illinois, the name of the place indicating the type of basin in which the driftwood settled and was covered with mud to form coal mines.

Lougee completely upset the idea that so much water was locked up in the Antarctic icecap that ocean levels were 300 feet lower. These "iceberg-rafterd erratic stones and boulders became grounded on the submerged topography of northern Kentucky and southwestern Missouri" which shows that most of the United States had not yet emerged from the floodwaters at the time of ice age maximum. An iceberg rafterd erratic, grounded on northern Kentucky, implies that only the mountains had risen above sea level.

One More Puzzling Feature of the Ice Age

Why was the general advance of the ice sheet, as shown by carbon dating, intermittent? As Dr. W. L. Stokes of the University of Utah states the problem: Any theory that proposes to solve the ice age must provide "A mechanism for cyclic repetitions, or oscillations, within the general period of glaciation."³² This is a severe requirement to demand of any theory, but the flood-ice-age theory can meet it. In the flood theory mountain ranges, islands and finally continents would rise through the receding floodwaters. Each rising range would block off the flow of floating ice, diverting warm or cold ocean currents, obstructing winds, changing directions

of prevailing warm or cold wind currents, lessening evaporation. This heterogeneous, changing panorama of factors inevitably produced the temporary retreats, re-advances, fluctuations, recessions, all within the general limits of the post-diluvian ice age.

This opens up a field for research: To correlate these carbon-dated advances and recessions with the rise of land masses and mountains and especially to consider how the rise of North America caused the Gulf Stream to resume its former flow and start melting the Scandinavian icecap.

The rising of mountains out of the ocean forms the basis of the "topographic control" theory, developed by R. F. Flint, glacial geologist. But he makes the rock masses of the mountains actually rise out of the water, whereas flood geologists speak of the mountains rising, in a figurative sense, meaning thereby that the mountains merely appear to rise as the waters recede.

The results of radioactive isotope dating indicate that European, American and Southern Hemisphere's ice ages were simultaneous. This upsets all those theories that move the poles around over different icecaps at different times. G. H. Dury writes, "It is now generally held that glacial maxima occur simultaneously in the north and south hemispheres. Similarly it is held that glaciation was simultaneous in Europe and in North America."³³

How Can We Explain the Climatic Optimum?

And this brings us to another of those questions that has mystified geologists—how to account for that strange period of abnormally warm weather that immediately followed the ice age. Glaciologist R. F. Flint writes,

The evidence of fossil plants and in addition several entirely independent lines of evidence, establish beyond doubt that the climate (with some fluctuations) reached a maximum of warmth between 6000 and 4000 years ago; since then (again with minor fluctuations) it has become cooler and more moist down to the present time. Apparently, as recently as 500 B.C. the climate was still slightly warmer than it is today. The warm, relatively dry interval of 2000 years' duration has been called the *Climatic Optimum*. It is the outstanding fact of the so-called postglacial climatic history.³⁴

Charles H. Hapgood writes, "The strange period of high temperature that followed the ice age . . . this warm period has been well established but its cause has been unknown."³⁵

But the flood theory provides the key that unlocks the mystery. When the ice age was well advanced and beginning to approach its closing

phases, the mountains of Antarctica and Greenland were rising through the receding waters, all bare now, because the first icecap had floated off and melted.

There was no more ice to melt, to make the earth into an icebox-style refrigerator, and a continuously decreasing amount of water vapor to make an evaporation-type refrigerator. The atmosphere was supersaturated, so now the reverse process set in and moisture vapor condensed on the bare rock mountains of Antarctica and Greenland and snow piled up into one or two miles thickness of ice.

And just as evaporation and melting are cooling processes, so condensation and freezing are warming processes. Just as every cubic centimeter of water takes 540 calories of heat out of the air as it vaporizes, so it gives back 540 calories when it condenses again and a further 80 calories when it freezes.

An Antarctic icecap 6,000,000 square miles in area and one mile thick would give off 1.4×10^{25} calories (14 septillion) of heat, which is about 5.6×10^{22} British thermal units (56 sextillion). This is equivalent to 2.3×10^{15} tons of coal, a figure which would probably reach 3 quadrillion tons if Greenland's icecap and the glaciers of high mountains were included in the calculation.

This astronomical quantity of heat was not released suddenly or it would have burned up the earth, but gradually over the period of 2000 years. This raised world temperature five degrees as stated by Brooks in his *Climate Through the Ages*. This was enough to bring the ice age rapidly to a close so that we read of "a sudden virtually complete disappearance of the ice sheet . . . in an extraordinarily short period."³⁶ Hapgood expresses doubt and amazement that, according to carbon dating, "the whole warming process could have taken place in 380 years?"

The incredibly rapid dissolution of the icecap and sudden ending of the ice age can best be explained and illustrated by an extremely simple laboratory experiment. If a large chunk of ice representing the Antarctic icecap is placed in a beaker of water, and smaller chunks representing the Greenland ice mass, and the glaciers from the tops of the world's high mountains; and if then, heat, representing the sun, is applied, the temperature will be found to remain at the melting-freezing point as long as any unmelted ice remains; that is, the ice age will continue. The temperature will not rise as long as any ice remains. But the last remaining piece of ice will disappear with surprising rapidity for the obvious reason that all heat from the sun is concentrated on the last little bit of ice.

After a short, so-called interglacial intermission, during which, as Hapgood expresses it, "a large part of Antarctica may have been ice-

free,"³⁷ a new icecap began to form on the mountains of Antarctica and the highest peaks of the Alps. But these newly-formed Alpine glaciers are not the survivors of the former antediluvian glaciers, which in my view floated away, but are freshly-frozen postdiluvian glaciers only a very few thousand years old.

Richard F. Flint, glaciologist of Yale, states that "A large number of the present glaciers of the Alps are not survivors of the last glacial maximum, as was formerly universally believed, but are glaciers newly created within roughly the last 4000 years."³⁸ The date fits smoothly into flood chronology, but cannot be made to fit into any of the prevailing theories.

The United States Army team of researchers at Camp Century on the northwest coast of Greenland have succeeded in drilling through 4562 feet of ice. They reached rock. "The researchers said they estimated the age by measuring layers in samples of the ice which, like tree rings, reflect each season . . . the ice there is about 10,000 years old."³⁹

This brings geology into as close an agreement with the Bible as could reasonably be expected. Furthermore, these same recent dates are exceedingly difficult to equate with any drifting continent theory of glacial origins.

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RELATION OF SOUTHERN PINE CONE SPIRALS TO THE FIBONACCI SERIES

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Patterns in nature, indicative of the existence of a Creator-God, are evident in the spiralling of pine cones. That spiralling, as many other natural phenomena, fits the mathematical abstraction known as the Fibonacci series. Pine cones display numbers of right and left spirals which are adjacent numbers in the Fibonacci series, 8 and 5 for the major southern pines. Approximately 50% of the cones will show maximum spiral counts to the right, and 50% to the left.

Introduction

As reported in a recent popular publication,¹ a curious, but seldom observed, pattern runs through much of nature. The reproduction of male bees, the number of spiral floret formations visible in many sunflowers, spiraled scales on pine cones and pineapples, the arrangement of leaves on twigs, and many other structures fit the Fibonacci series. That series, developed by the Italian mathematician Leonardo of Pisa, nicknamed Fibonacci (circa 1170-1230), is 0,1,1,2,3,5,8,13,21 . . . , with each number the sum of the previous two numbers.² This paper reports the relation of pine cone scales of the major southern pines to the Fibonacci series.

Counting Pine Cone Spirals

The number of spirals to the right and to the left around a cone at any point will be adjacent numbers in the Fibonacci series, although the counts may vary on top, middle, and bottom portions of the cone. Consistency within a species is detected if counts are made around the middle of cones.

To observe this, one should use a closed pine cone. (Open cones will close after soaking in water for an hour or so.) Selecting the exposed portion of a centrally located scale, note that it is part of a spiral to the right and left, with adjacent sides of scales meeting for one-half or more of their length (Figure 1).

The number of spirals around the cone at this point, to the right and left, is counted. Almost without fail, counts may be observed which are adjacent numbers in the Fibonacci series (e.g., 5 right, 8 left).

Methods

Cones of the major southern pines, loblolly pine (*Pinus taeda* L.), shortleaf pine (*P. echinata* Mill.), longleaf pine (*P. palustris* Mill.), and slash pine (*P. elliottii* Engelm.), have 8, 5

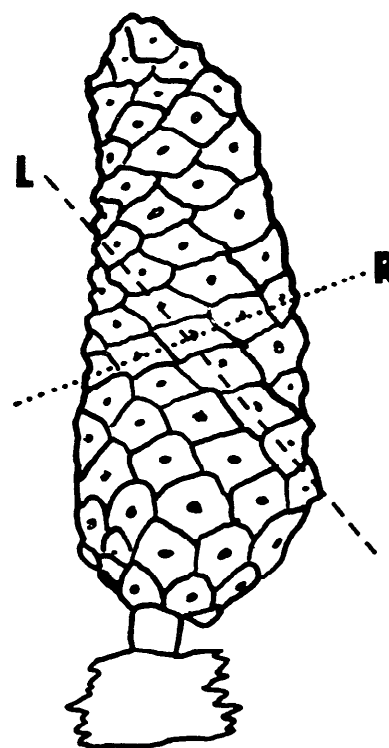


Figure 1. Pine cone spirals to the right (R) and left (L).

spiral counts. Other species may exhibit different counts. For example, counts for eastern and western white pines (*P. strobus* L. and *P. monticola* Dougl.) are 3 and 5.

Preliminary studies indicate approximately 50% of the cones give the maximum count of 8 to the right and 50% show that maximum to the left. Collections were made from single trees and from young and mature stands to test the 50:50 hypothetical ratio using chi-square analysis corrected for continuity. Significance was tested at the 5% level of probability with 1 degree of freedom.

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Table 1. Spiral counts of cones from individual trees.

Species of pine	Tree	Number of cones with maximum counts to the		Chi-square value
		Right	Left	
Loblolly	A	39	57	3.01 n.s.
	B	5	5	—
	C	4	6	0.10 n.s.
	D	7	3	0.90 n.s.
	E	6	4	0.10 n.s.
	F	5	3	0.12 n.s.
	total	66	78	0.84 n.s.
Shortleaf	A	5	5	—
	B	8	2	2.50 n.s.
	C	4	6	0.10 n.s.
	D	7	3	0.90 n.s.
	E	7	3	0.90 n.s.
	total	31	19	2.42 n.s.

n.s. = not significant at the 5% level of probability.

Note: Tests for heterogeneity of proportions, as outlined by Snedecor and Cochran,³ of right and left spirals were not significant for either species, indicating no real differences in proportions among samples.

Table 2. Spiral counts of cones from young and mature southern pine stands.

Species of pine	Stand condition	Number of cones with maximum counts to the		Chi-square value
		Right	Left	
Loblolly	Young	11	14	0.16 n.s.
	Mature	13	12	0 n.s.
	total	24	26	0.02 n.s.
Shortleaf	Young	15	10	0.64 n.s.
	Mature	12	13	0 n.s.
	total	27	23	0.18 n.s.
Longleaf	Young	12	13	0 n.s.
	Mature	10	15	0.64 n.s.
	total	22	28	0.50 n.s.
Slash	Young	12	13	0 n.s.
	Mature	15	10	0.64 n.s.
	total	27	23	0.18 n.s.

n.s. = not significant at the 5% level of probability.

Results

Cones collected from individual loblolly and shortleaf pine trees showed no significant departures from the 50:50 hypothetical ratio (Table 1). Results from collections in stands of young and mature southern pines are shown in Table 2. Again, in no case was there a significant departure from the 50:50 hypothetical ratio.

It appears, then, that the genetic factors causing maximum spiral counts to the right or left operate in a completely random fashion. Molberg⁴ recently suggested that such spiralling may

be related to the spiral nature of the D.N.A. molecule. The creationist, again, is impressed with the patterns of nature which speak eloquently of our Creator-God.

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THE MEDICAL DOCTOR AND "OCCAM'S RAZOR"

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The concept of the unifying hypothesis is discussed, then is illustrated by taking a simple case history of acute pneumonia which could be diagnosed quite easily by reasonable attention to the patient's "overall picture" rather than to irrelevant detail.

A somewhat rough analogy is presented in the approach to medical education. A specific instance of a poor educational approach is the inordinate amount of time which students must spend drilling upon classical Darwinian evolutionary concepts, which are not only beyond proof but actually cause fragmentation within the expanding mass of medical scientific knowledge.

Introduction

The title of this article intends neither pun nor play on words, and certainly no offense is intended to friends in the professions of surgery and barbering!

In scientific jargon "Occam's Razor" is the term sometimes applied to the concept of the unifying hypothesis. This simply means that, when the scientist is presented with a series of observations, he attempts to draw from them one single hypothesis that will best fit all of the data rather than try to manufacture several different hypotheses or explanations of his observations.

A medical doctor finds early in his schooling, and even more so as he continues in his profession, that the practice of medicine involves a large proportion of art with a lesser proportion of science. Perhaps during recent decades in a scientifically-oriented world, it is no longer correct to say that medicine is "90% art and 10% science"; however, it is still true that medicine remains inexact when compared to the physical sciences.

Still, one of the things the medical doctor has in common with the chemist, biologist, physicist, is his constant use of this principle of the unifying hypothesis. Almost unconsciously the doctor applies this in his day-to-day practice of treating illness no matter what the doctor's sub-specialization of medicine happens to be.

In his sophomore year of medical school, the new doctor is taught this basic tenet: whenever a multitude of symptoms and signs of illness are seen, first seek to explain all or most of them as some fault in only *one* of the body's systems. The medical student learns, that *usually* an acute illness is correctly diagnosed, only if he can resolve what initially may seem conflicting and confusing information about the patient into one logical sequence which will most likely point to the responsible disease.

Illustrative Case History

This may be easily illustrated by giving this following case history:

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A 46 year old man well-known by past history to be careless about his eating and drinking habits has tendency toward occasional "weekend binges." He comes to the doctor's office on Monday morning with main complaint of intense pain around one eye. The patient is observed to have some fever and appears quite ill. Other complaints are considerably underplayed while the patient bitterly complains of eye pain. He does mention slight pain in the right shoulder, (very vaguely attributed to muscle strain by the patient) and "upset stomach" with nausea and vomiting. The patient also passes over certain questions about coughing and breathing difficulty, passing these off as "smoking a little too much."

Now, the unaware student physician could easily be trapped into a very poor diagnosis in this kind of situation. For instance, if he seized upon the patient's main complaint of eye pain, he might eagerly grab up his ophthalmoscope and spend the next 20 minutes in intense scrutiny of the patient's eye-grounds in search of the "tell-tale" signs that will confirm his snap diagnosis of "optic neuritis" or even "brain tumor." In such a situation, the student may be so misled that he forgets all about watching how the patient breathes.

But if he had been careful to watch the patient's right chest, he might have found that there was a slight difference in the way the right side of his chest moved on inspiration. If the young, inexperienced doctor had been more detailed in checking the patient's history, he might have found that the pain in the shoulder was not quite like that of "straining a muscle," especially since that pain tended to get worse with a quick, deep breath. Then there could be undue attention to the stomach pain and other abdominal complaints.

A well-read and bright student could quickly jot down a multitude of diagnoses, all of them appearing in multiple body systems. For instance, he might write down brain tumor, rule out retro-bulbar neuritis, bursitis of right shoulder, and even early acute appendicitis. The student has thus diagnosed something wrong in (1) the central nervous system, (2) the musculo-

skeletal scalpul system, and (3) the gastrointestinal system! He could have thrown in a fourth by mentioning the respiratory tract irritation from "smoking too much."

Fortunately, in this imaginary case, an experienced doctor comes along and puts together all of the information in a much more meaningful way. One of the first questions the experienced man will ask is: "How can I group all of these symptoms together into one body system and explain how they could arise in one disorder of that system?" Thus, rather than losing himself in a minutely-detailed half-hour of the patient's painful eye, he puts the stethoscope to the right chest and hears strange "noises."

Very soon, the doctor has arrived at a working diagnosis, for this hypothetical patient has a case of acute right lower lung lobar pneumonia which accounts for (1) fever, (2) reduced motion of the right chest, (3) pain in the right shoulder, (4) a very ill general appearance, and (5) the sounds heard with the stethoscope. The older physician has used several points of information which have led him quickly toward thorough chest examination.

First of all, he knew some of the patient's habits and what kind of illnesses are likely to come from a long "binge." Most of all, he is not misled by "red herrings" which, although they could have some importance, do not tend at all to resolve the patient's problem into some single diseased body system.

By thinking of the respiratory tract first, however, the doctor has arrived at a reasonably good explanation for the eye pain: the patient has an upper respiratory tract infection, an acute sinusitis, accounting for the pain around the eye, which is the patient's main complaint at the moment. The doctor also realizes that acute sinusitis and pneumonia—particularly in a patient of this type—often occur together. Further examination of the abdomen, and questioning of the patient, throw out serious entertainment of an additional diagnosis of acute appendicitis.

The patient does well when he is treated with appropriate antibiotics and rest! In fact, very much better than he would have done if put through an exhaustive work-up for "brain tumor," eye disease, and appendicitis which were nonexistent.

Specific "Unifying Hypothesis" Examined

This case simply shows how the medical scientist can effectively use information at his disposal. While neither denying or decrying the tremendous advances that scientists have gained in this

century, sometimes we are forced to wonder if what is now being called "science" will be of continuing benefit to humanity. Objective science is being progressively eroded by certain philosophies which now permeate the thinking of the great majority of the scientific specialties, especially biology.

Unfortunately, these philosophies stand largely upon an abject denial of some very important facts about human history and about human nature. The "uniformitarianism" of the Darwinist is one such faulty concept; and, of course, Darwinism serves as the "unifying hypothesis" for nearly everyone in the biological sciences today.

But the more Darwinism is examined, the more clearly is revealed its failure as a unifying hypothesis. Witness the unbelievable multiplicity of hypotheses spun out under evolutionary doctrine to explain away everything from life origins to the "biological similarities" found among some bacteria and mammalian cells. Instead of having something with which he can work, the biologist is left with a staggering mass of disconnected, totally unrelated facts. Small wonder that today's new medical students are in effect saying to their instructors: "Don't teach me all that irrelevant junk! Just show me how to treat disease!"

In a way, the students are right, though their over-reactions often foster poor attitudes toward that learning absolutely necessary in medicine. For, after all, just what does a six-month course in learning the intricate supposed "evolutionary relationships" among the dog-fish shark, the scale fish, the salamander, the house cat, the chimpanzee, and finally man have to do with learning how to diagnose a simple case of human pneumonia?

Now, I am not trying to undermine sincere medical educators by these statements. I merely submit that for lack of any satisfactory unifying hypothesis in the biological sciences—because of our sad failure to effectively wield "Occam's Razor" as we approach our data—we are beginning to find ourselves in very grave danger of "losing our patient," so to speak. Much like the fledgling doctor taking comfort in complexity and losing himself in unimportant minutia, we may well just sit by to watch our science and civilization slip right on out of this world!

I furthermore submit that there is a real unifying hypothesis available to all scientists. This hypothesis, if taken at its literal truth, provides the only basis of true science (See Colossians 1:16-17). Without such a concept, what do we really have to expect in the way of "benefits" from medical science?

ELECTROMAGNETICS OF THE EARTH'S FIELD AND EVALUATION OF ELECTRIC CONDUCTIVITY, CURRENT, AND JOULE HEATING IN THE EARTH'S CORE

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Evidence of decay in the earth's main magnetic field and the fact that Sir Horace Lamb's "model" of the earth's magnetic field indicated that it should decay, have aroused renewed interest in his famous work. However Lamb's original treatises^{1,2} are difficult to follow because they are cast in outmoded terminology and draw upon additional papers^{3,4,5,6,7} that are not well referenced.

Because of the great importance of the phenomenon this paper begins with first principles and derives the relevant equations in the terminology of our day and in a more convenient coordinate system. In light of seismic knowledge the earth is assumed to contain a conducting core⁸ of known radius and also assumed to have electric currents. Solutions for the internal and external magnetic fields are derived and show as did Lamb's solutions that the currents and magnetic fields decay exponentially with time.

After evaluating the time constant from existing data the conductivity of the core material is evaluated (assuming a uniform core). A solution is also obtained for the distribution of the current density in the core. Then the total current and Joule heating are solved. The time constant is 1970 years; total current is six billion amperes; and the Joule heating is two hundred million calories per second.

Introduction

The most remarkable geophysical phenomenon observed on a world-wide scale in modern times is the rapid decay of the earth's main magnetic field^{9,10}. Taking the real time observations of this decay and assuming that it will continue, it is known that the earth's main magnetic field will be gone in a few thousand years¹¹. The author's analysis shows that this is not a periodic electromagnetic oscillation but is an aperiodic phenomenon with so much damping that no reversal of the magnetic field can take place before the magnetic field is completely gone. Extrapolating the phenomenon backwards and ruling out implausibly large values for the initial current and magnetic field shows that the earth's magnetic field is of recent origin, and does not have the so-called "geologic age" of billions of years¹².

Because of its great importance a detailed study of this electromagnetic phenomenon is developed in this paper. It is a reinvestigation of the problem first studied theoretically by Horace Lamb^{13,14}. Maxwell's field equations are applied and solved for the appropriate boundary conditions associated with the earth's magnetism.

Existing data on the earth and its magnetic dipole field are used to evaluate the time constant (time to decay to 1/eth of its value), the conductivity of the core, and the current density distribution in the core. Using the value of conductivity and integrating the square of the current density over the core volume yields the Joule heating. Integrating the current density over the appropriate cross section yields the total current in the core.

All data were processed on a CDC 3100 electronic computer. A least square exponential fit was employed on the existing magnetic dipole data to evaluate the time constant. As a separate check it was noted that the variability was smaller for this exponential fit than for a straight line fit, as one would expect from the exponential solutions obtained from Maxwell's equations.

The SI system of units is employed and the symbols for the physical quantities are:

- E electric field (volt/meter)
- B magnetic induction (tesla)
- H magnetic field
- D displacement
- J current density (ampere/meter²)
- σ conductivity (mho/meter)
- μ permeability
- A vector potential
- P power (watt)
- t time (second)
- T time constant (second)

I. Derivation of Solutions in the Core

Beginning with the Maxwell's equation:

$$\nabla \times \underline{\underline{E}} + \frac{\partial \underline{\underline{B}}}{\partial t} = 0, \quad (1)$$

$$\nabla \times \underline{\underline{H}} - \frac{\partial \underline{\underline{D}}}{\partial t} = \underline{\underline{J}}, \quad (2)$$

$$\nabla \cdot \underline{\underline{B}} = 0, \quad (3)$$

the constituent equations;

$$\underline{\underline{B}} = \mu \underline{\underline{H}}, \quad (4)$$

$$\underline{\underline{J}} = \sigma \underline{\underline{E}}, \quad (5)$$

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and the defining equation for vector potential $\underline{A}$; reduces to the scalar form

$$\underline{B} = \nabla \times \underline{A}, \quad (6)$$

one obtains in the conducting spherical core, after neglecting the displacement current, imposing the Coulomb gauge, and assuming that $\underline{E}$ is derivable from the vector potential alone ($\underline{A}$ much used device; see, for example, Lawson¹⁵), the wave equation

$$\nabla^2 \underline{A} = \sigma \mu \frac{\partial \underline{A}}{\partial t}. \quad (7)$$

Adopting spherical coordinates and assuming a circular current mode one writes

$$\underline{J} = \underline{e}_\phi J_\phi. \quad (8)$$

By looking at the form of equation (7) along with expectations about the physical behavior of the system, one assumes that the time solution is a *real* exponential with negative argument. Hence, the solution has the form

$$\underline{A}(\underline{r}, t) = \underline{A}(\underline{r}) e^{-t/T}, \quad (9)$$

where T is the time constant. Equation (7) reduces to

$$\nabla^2 \underline{A} = -\frac{\sigma \mu}{T} \underline{A}. \quad (10)$$

Expanding the Laplacian of vector $\underline{A}$ in spherical coordinates¹⁶ and noting that $\underline{A}$, like $\underline{J}$ in equation (8), has only the azimuthal component and depends only on r and θ , equation (10) re-

$$\nabla^2 A_\phi - \frac{A_\phi}{r^2 \sin \theta} = -\frac{A_\phi}{L^2} \quad (11)$$

where there has been the substitution

$$\frac{\sigma \mu}{T} = \frac{1}{L^2}. \quad (12)$$

In order to show the relation between $\underline{J}$ and $\underline{A}$, the expression

$$\underline{E} = -\frac{\partial \underline{A}}{\partial t} \quad (13)$$

is obtained from equations (1) and (6) subject to the previously noted restriction that $\underline{E}$ is derivable from $\underline{A}$ alone. In view of equation (5) one may write equation (13) in the form

$$\underline{J} = -\sigma \frac{\partial \underline{A}}{\partial t}, \quad (14)$$

and then reduce it to the scalar form

$$J_\phi = -\frac{\sigma}{T} A_\phi \quad (15)$$

by carrying out the partial derivative with respect to time.

Equation (11) is now solved by the separation of variables technique. One assumes that A_ϕ may be written as

$$A_\phi = A(\theta) A(r). \quad (16)$$

Equation (11) is now expanded into the form

$$\frac{1}{r^2} \frac{\partial}{\partial r} \left(r^2 \frac{\partial A_\phi}{\partial r} \right) + \frac{1}{r^2 \sin \theta} \frac{\partial}{\partial \theta} \left(\sin \theta \frac{\partial A_\phi}{\partial \theta} \right) + \left(\frac{1}{L^2} - \frac{1}{r^2 \sin^2 \theta} \right) A_\phi = 0. \quad (17)$$

By utilizing the differential equation for the associated Legendre polynomial, namely

$$\frac{1}{\sin \theta} \frac{\partial}{\partial \theta} \left[\sin \theta \frac{\partial}{\partial \theta} P_\ell^m(\cos \theta) \right] + \left[\ell(\ell+1) - \frac{m^2}{\sin^2 \theta} \right] P_\ell^m(\cos \theta) = 0$$

where l and m are integers, l being positive and $-l \leq m \leq l$, one may now substitute equation (16) into (17) and obtain the separated equations. It is observed that

$$A(\theta) = P_l^m(\cos \theta) \quad (18)$$

The differential equation for $A(r)$ is

$$\frac{1}{r^2} \frac{d}{dr} \left[r^2 \frac{dA(r)}{dr} \right] - \frac{l(l+1)}{r^2} A(r) + \frac{1}{L^2} A(r) = 0 \quad (19)$$

The smallest value for l is 1, since m is 1 in this case. By making the substitution

$$A(r) = \frac{u(r)}{r} \quad (20)$$

equation (19) reduces to

$$\frac{d^2 u(r)}{dr^2} - \left(\frac{2}{r^2} - \frac{1}{L^2} \right) u(r) = 0 \quad (21)$$

for $l = 1$, the lowest mode. It is realized that the lowest mode solution is not the most general solution, but as Lamb pointed out, the higher modes decay more rapidly. The lowest mode should give the most physically reasonable re-

sults. Examining equation (21), one sees that it has a non-essential singularity at $r = 0$. Hence the series solution technique may be employed and one finally obtains the solution, for convergence at the origin,

$$u(r) = 3a_0 L^2 \left(\frac{L}{r} \right) \sum_{n=1}^{2n+1} (-1)^{n-1} \frac{\left(\frac{r}{L} \right)^{2n+1}}{(2n-1)!(2n+1)!} \quad (22)$$

Equation (22) is manipulated into closed form by letting

$$S = \sum_{n=1}^{2n+1} (-1)^{n-1} \frac{\left(\frac{r}{L} \right)^{2n+1}}{(2n-1)!(2n+1)!} \quad (23)$$

Differentiating,

$$\frac{dS}{d\left(\frac{r}{L}\right)} = \sum_{n=1}^{2n} (-1)^{n-1} \frac{\left(\frac{r}{L} \right)^{2n}}{(2n-1)!} = \frac{r}{L} \sum_{n=1}^{2n-1} (-1)^{n-1} \frac{\left(\frac{r}{L} \right)^{2n-1}}{(2n-1)!} \quad (24)$$

Hence,

$$\frac{dS}{d(r/L)} = \frac{r}{L} \sin(r/L) \quad (25)$$

From the fact that

$\int y \sin y \, dy = \sin y - y \cos y + C$,
then

$$S = \sin\left(\frac{r}{L}\right) - \frac{r}{L} \cos\left(\frac{r}{L}\right) + C, \quad (26)$$

When r is 0, S is 0; hence, $C = 0$ and

$$S = \sin\left(\frac{r}{L}\right) - \frac{r}{L} \cos\left(\frac{r}{L}\right) \quad (27)$$

From equations (22), (23), and (27) the solution may be written in the following closed form:

$$u(r) = 3 a_0 L^2 \left[\frac{\sin\left(\frac{r}{L}\right)}{r/L} - \cos\left(\frac{r}{L}\right) \right], \quad (28)$$

From equations (16), (18), (20), (28) and the fact that $P_1^1(\cos \theta) = -\sin \theta$, thus

$$A_\phi = \frac{-3a_0 L}{(r/L)} \left[\frac{\sin\left(\frac{r}{L}\right)}{r/L} - \cos\left(\frac{r}{L}\right) \right] \sin \theta, \quad (29)$$

Then, from equation (15),

$$J_\phi = -\frac{3\sigma a_0 L}{T (r/L)} \left[\frac{\sin\left(\frac{r}{L}\right)}{r/L} - \cos\left(\frac{r}{L}\right) \right] \sin \theta, \quad (30)$$

From equation (6) one notes that B may be obtained by taking the curl of A . Since A_ϕ is the only component of A , it can be shown with the aid of equation (29) and the expansion for the curl in spherical coordinates, that B has the components

$$B_r = -\frac{6a_0}{\left(\frac{r}{L}\right)^2} \left[\frac{\sin\left(\frac{r}{L}\right)}{\frac{r}{L}} - \cos\left(\frac{r}{L}\right) \right] \cos \theta \quad (31)$$

and

$$B_\theta = \frac{3a_0}{\left(\frac{r}{L}\right)} \left[\frac{\frac{r}{L} \cos\left(\frac{r}{L}\right) - \sin\left(\frac{r}{L}\right) + \left(\frac{r}{L}\right)^2 \sin\left(\frac{r}{L}\right)}{\left(\frac{r}{L}\right)^2} \right] \sin \theta. \quad (32)$$

II. Matching of Field Solutions at the Boundary

It is now desirable to obtain the magnetic field external to the core for the purpose of matching solutions at the boundary. Outside the core, assuming that the permeability for the mantle, crust, atmosphere, and space are approximately the same, one may write

$$\nabla \times \underline{H} = 0, \quad \text{and} \quad (33)$$

$$\nabla \cdot \underline{H} = 0. \quad (34)$$

Hence, $H(r)$ is derivable from a scalar function of space. Then

$$\underline{H} = -\nabla \phi_m. \quad (35)$$

Utilizing equation (34),

$$\nabla^2 \phi_m = 0. \quad (36)$$

The solution to (36) is well known and for azimuthal symmetry may be written as¹⁷

$$\phi_m(r, \theta) = \sum_{\ell=0}^{\infty} \left[C_{\ell} r^{\ell} + D_{\ell} r^{-(\ell+1)} \right] P_{\ell}(\cos \theta). \quad (37)$$

For $r > R_c$, the radius of the core, one has $C_{\ell} = 0$ for convergence. Hence,

$$\phi_m(r, \theta) = \sum_{\ell=0}^{\infty} D_{\ell} r^{-(\ell+1)} P_{\ell}(\cos \theta). \quad (38)$$

The H components are, therefore,

$$H_r(r, \theta) = \frac{\partial \phi_m}{\partial r} = \sum_{\ell=0}^{\infty} D_{\ell} (\ell+1) r^{-(\ell+2)} P_{\ell}(\cos \theta), \quad (39)$$

$$H_{\theta}(r, \theta) = -\frac{1}{r} \frac{\partial \phi_m}{\partial \theta} = -\sum_{\ell=0}^{\infty} D_{\ell} r^{-(\ell+2)} \frac{\partial}{\partial \theta} P_{\ell}(\cos \theta). \quad (40)$$

At the boundary between the core and the mantle

$$B_r(\text{core}) = B_r(\text{mantle})$$

and

$$H_{\theta}(\text{core}) = H_{\theta}(\text{mantle}). \quad (41)$$

Hence, by aid of equations (4), (31), (32), (39), (40), and (41), the boundary matching equations may be written as

$$\frac{-6a_0}{\left(\frac{R_c}{L}\right)^2} \left[\frac{\sin\left(\frac{R_c}{L}\right)}{R_c/L} - \cos\left(\frac{R_c}{L}\right) \right] \cos \theta = \mu_m \sum_{\ell=0}^{\infty} D_{\ell} (\ell+1) R_c^{-(\ell+2)} P_{\ell}(\cos \theta), \quad (42)$$

and

$$\frac{3a_0}{\mu_c \left(\frac{R_c}{L}\right)} \left[\frac{\frac{R_c}{L} \cos\left(\frac{R_c}{L}\right) - \sin\left(\frac{R_c}{L}\right) + \left(\frac{R_c}{L}\right)^2 \sin \frac{R_c}{L}}{\left(\frac{R_c}{L}\right)^2} \right] \sin \theta = -\sum_{\ell=0}^{\infty} D_{\ell} R_c^{-(\ell+2)} \frac{\partial P_{\ell}(\cos \theta)}{\partial \theta}, \quad (43)$$

where R_c is the core radius.

By examination of equations (42) and (43), it is seen that $D_{\ell} = 0$ for all values of ℓ except $\ell = 1$. It is also evident that the permeabilities of the core and mantle are equal and

$$L = \frac{R_c}{\pi} \quad (44)$$

for D_1 to have consistent values in equations (42) and (43). Therefore,

$$\frac{-6a_0}{\pi} \cos \theta = 2\mu_0 D_1 R_c^{-3} \cos \theta, \quad (45)$$

$$\frac{-3a_0}{\mu_0 \pi} \sin \theta = D_1 R_c^{-3} \sin \theta. \quad (46)$$

It is clear, therefore, that

$$D_1 = \frac{-3a_0 R_c^3}{\mu_0 \pi^2} \quad (47)$$

Hence, the components of the external B field are in the form of

$$B_r = \frac{-6a_0 R_c^3}{\pi^2 r^3} \cos \theta, \quad (48)$$

$$B_\theta = \frac{-3a_0 R_c^3}{\pi^2 r^3} \sin \theta. \quad (49)$$

By utilizing equation (48), it is seen that at the earth's austral magnetic pole,

$$B_{R_e} = B_0 = \frac{-6a_0 R_c^3}{\pi^2 R_e^3} \quad (50)$$

where R_e is the radius of the earth and B_0 is the value of the B field at the pole. Hence,

$$a_0 = \frac{-\pi^2}{6} \left(\frac{R_e}{R_c} \right)^3 B_0. \quad (51)$$

III. Reduced Solutions for the Field Components and the Time Constant

Now the internal and external field may be expressed in terms of B_0 . *Inside* of the earth's core,

$$B_r = \frac{\pi^2 \left(\frac{R_e}{R_c} \right)^3 B_0}{\left(\frac{\pi r}{R_c} \right)^2} \left[\frac{\sin \left(\frac{\pi r}{R_c} \right)}{\pi r / R_c} - \cos \left(\frac{\pi r}{R_c} \right) \right] \cos \theta \quad (52)$$

and

$$B_\theta = \frac{-\pi^2 \left(\frac{R_e}{R_c} \right)^3 B_0}{2 \left(\frac{\pi r}{R_c} \right)} \left[\frac{\frac{\pi r}{R_c} \cos \frac{\pi r}{R_c} - \sin \frac{\pi r}{R_c} + \left(\frac{\pi r}{R_c} \right)^2 \sin \frac{\pi r}{R_c}}{\left(\frac{\pi r}{R_c} \right)^2} \right] \sin \theta. \quad (53)$$

Outside of the earth's core,

$$B_r = \frac{B_0 R_e^3 \cos \theta}{r^3} \quad (54)$$

and

$$B_\theta = \frac{B_0 R_e^3 \sin \theta}{2r^3}. \quad (55)$$

The time constant (time for the field to decay to 1/e of its initial value) is found from (12) and (44) to be

$$T = \frac{\sigma \mu_0 R_c^2}{\pi^2} . \quad (56)$$

IV. Evaluation of Time Constant and Conductivity

Table 1 contains the historical values of the earth's magnetic dipole moment, the corresponding values of the B field at the poles, the date (epoch), and the scientists who made the determinations¹¹. A least squares curve fit to these data yields a time constant $T = 6.21 \times 10^{10}$ sec (1970 years). Substituting this value of the time constant into equation (56) and using the value for earth's core radius, $R_c = 3.473 \times 10^6$ meters, one obtains a conductivity $\sigma = 4.04 \times 10^4$ mho/meter.

Table 1. Magnetic Dipole Moment M and B_0 at the Poles. 1835 to 1965*

Scientist	Epoch	M (amp meter ²) $\times 10^{22}$	B_0 (tesla) $\times 10^{-5}$
Gauss	1835	8.558	6.618
Adams	1845	8.488	6.564
Adams	1880	8.363	6.468
Neumayer	1880	8.336	6.448
Fritsche	1885	8.347	6.456
Schmidt	1885	8.375	6.478
Vestine, et al	1905	8.291	6.412
Vestine, et al	1915	8.225	6.362
Dyson-Furner	1922	8.165	6.314
Vestine, et al	1925	8.149	6.302
Vestine, et al	1935	8.088	6.256
Jones-Melotte	1942.5	8.009	6.194
Vestine, et al	1945	8.065	6.238
Afanasieva	1945	8.010	6.194
U.S.C. & G.S.	1945	8.066	6.238
Fanslau-Kautzleben	1945	8.090	6.256
U.S.C. & G.S.	1955	8.035	6.214
Finch-Leaton	1955	8.067	6.240
Nagata-Oguti	1958.5	8.038	6.216
Cain, et al	1959	8.086	6.254
Fougere	1960	8.053	6.228
Adam, et al	1960	8.037	6.216
Jensen-Cain	1960	8.025	6.206
Leaton, et al	1965	8.013	6.198
Hurwitz, et al	1965	8.017	6.200

*The table is constructed utilizing data from a ESSA Technical Report ¹¹. The B_0 values are obtained from the far field approximation.

V. Current in the Earth's Core

The current density inside of the earth's core is found from (30) and (51) to be

$$J_\phi = \frac{\pi^3}{2\mu_0 R_c} \left(\frac{R_e}{R_c}\right)^3 B_0 \left[\frac{\sin\left(\frac{\pi r}{R_c}\right)}{\left(\frac{\pi r}{R_c}\right)} - \cos\left(\frac{\pi r}{R_c}\right)\right] \sin \theta . \quad (57)$$

Integrating this over a semicircular area of the core through which current flows

$$I = \frac{\pi}{\mu_0} B_0 R_c \left(\frac{R_e}{R_c}\right)^3 \int_0^\pi \left(\frac{\sin x}{x} - \cos x\right) dx, \quad (58)$$

where $x = \frac{\pi r}{R_c}$. Determining the value of the integral in (58) to be 1.8519 and using $B_0 = 6.20 \times 10^{-5}$ tesla for the value of the polar field and $R_e = 6.371 \times 10^6$ meters for the earth radius, the current (I) in the earth's core is found to be 6.16×10^9 amperes.

Figure 1 shows the distribution of the current density with distance from the center in the mag-

netic equatorial plane. The maximum current density of 5.95×10^{-4} amp/m² occurs at approximately a distance of $\frac{2}{3}$ of the core radius.

VI. Joule Heating in the Earth's Core

One may solve for the Joule heating in the earth's core by means of the integration

$$P = \iiint \frac{J^2}{\sigma} dV, \quad (59)$$

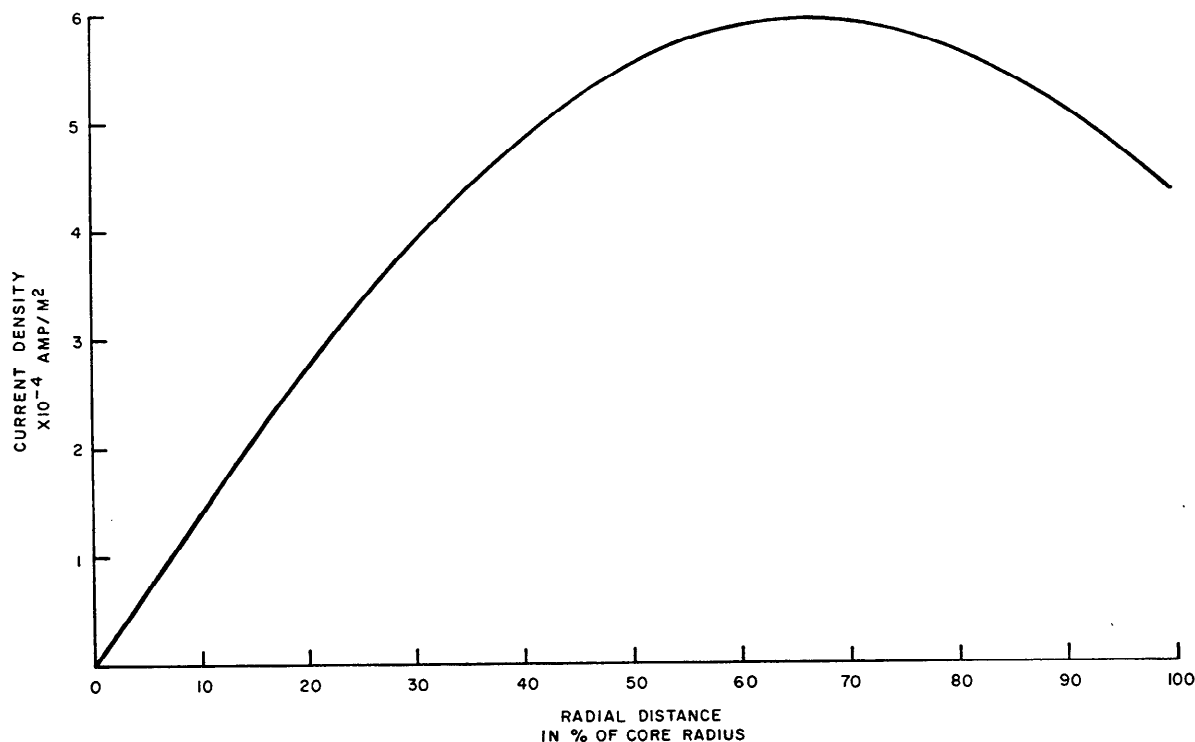


Figure 1. Current density in the magnetic equatorial plane as a function of radial distance.

where the current density from equation (57) is to be used. Choosing the volume element $2\pi r^2 \sin \theta d\theta dr$ reduces (59) to a double integral.

After integrating with respect to θ from 0 to π and making the substitution $x = \frac{\pi r}{R_c}$,

$$P = \frac{2\pi^4 R_c}{3\sigma \mu_0^2} \left(\frac{R_e}{R_c}\right)^6 B_0^2 \int_0^\pi \left(\frac{\sin^2 x}{x^2} - \frac{2 \sin x \cos x}{x} + \cos^2 x \right) dx, \quad (60)$$

which yields

$$P = \frac{\pi^5 R_c}{3\sigma \mu_0^2} \left(\frac{R_e}{R_c}\right)^6 B_0^2. \quad (61)$$

Using the previously determined value of conductivity and the present value of B_0 ,

$$P = 8.13 \times 10^8 \text{ watts}$$

or

$$P = 1.94 \times 10^8 \text{ calories/second}$$

for the Joule heating in the earth's core.

Conclusions

Application of Maxwell's equations to currents in the conducting core of the earth has yielded solutions for both the internal and external magnetic fields of the earth as functions of time.

The constants in these equations have been evaluated from the known data accumulated over a period of 130 years. The solutions show

an aperiodic decay with a time constant of 1970 years (1400 year half-life) which has important geochronological implications.

This paper also demonstrates the usefulness of these solutions in studying properties of the core of the earth, by evaluating the conductivity, current distribution, total current, and joule heating in the earth's core.

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THE CHALLENGE OF HISTORICAL GEOLOGY

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Introduction

Over the past decades, no doctrine has so challenged the creationist interpretation of the physical universe, as that viewpoint based on the uniformitarian outlook. This method involves interpretation of past events solely in terms of present day occurrences.

Philosophically, uniformitarianists assume that "Nature" can be satisfactorily explained exclusively in terms of natural causes. Indeed, in an extreme form the teaching states, "there is no vestige of a beginning nor prospect of an end." Thus when consistently applied the doctrine entails the assumption that the Natural Universe is an autonomous (independent and self-existent) system, which exists without a creator God.

The vital truth of a created universe, sustained by the word of God's power, is of pivotal importance today—if man is not to end up as a mere chance collection of atoms. A clear stand for creation is necessary to prevent men rationalizing and accepting this sorry plight of a meaningless universe.

The Danger and the Challenge

If God is relegated to the position of the Unknown and Unknowable, or a "God of the gaps," not only is this false to the Scriptural teaching

and the fact that "the Heavens declare the glory of God," but man is then designated as merely a bio-chemical machine. He grows for a while, declines, and at death returns to the dust. Or put in other words, man would be integrated into the void of nothingness, doomed to chaos and Old Night.

For this reason, creationists must take issue with historical geologists, who are ever seeking to justify their naturalistic interpretation of the Universe, by recourse to the doctrine, "the present is the key to the past." It is in this context especially that the challenge of historical geology should be seen, a challenge involving not only the origin of the Universe and its end, but also of the acme of creation—man himself.

As the facts and the interpretation of those facts cannot be separated, we can agree with Professor Hartshorne that scientific description includes "... both what is known and what can be inferred, both of the phenomena and of the process relations and associations of phenomena."¹ This leaves an amazing span of complex information in the hands of the historical geologist to interpret;

... since the historical geologist is the only scientist who is presented with material for studying the history of the world in remote times, he finds that he must include historical botany, zoology, and human anatomy, and even to some extent historical social anthropology.²

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Has the framework the historical geologist selects been clearly proven? What are the possible alternatives? It is to these matters that we now turn.

Three Areas of Disagreement

Apart from the vast scope of the subject matter of historical geology, there are still three broad fronts on which scientists and theologians disagree:

(1) *World and Life View*: There is firstly the problem of a starting point. All too often, scientists are not aware of the ultimate assumptions they are making, when organizing data. Sometimes, their premises come from a supernaturalistic or naturalistic viewpoint. Others would argue that "science" and "religion" are two separate spheres.³

As an example, Professor L. C. King, a leading world authority on geomorphology (the study of land forms) states, "In the beginning . . . the earth was void and without form." It was born of a heavenly body about 4,500 million years ago. . . .⁴ This comment is an attempt to recognize the Genesis account of creation, but then goes on to link it with modern scientific extrapolation based on naturalistic assumptions. The question of origins is put firmly by the Scriptures in the area of Divine Revelation.⁵ Yet, Professor King claims to be a neutral observer:

It was necessary for the author to see as much of the earth's surface as possible, yet not to interpret it in terms of preconceived philosophies; often to sit passively upon hills just letting the scenery "soak in" and teach the beholder—when he is sufficiently humble.⁶

Still further, elsewhere, he claims that a uniformitarian interpretation is really the only viable one: ". . . on a uniformitarian earth just as the geological evidence indicates it to have been ever since geologic time began."⁷

However, what sort of logic is it which states one is not committed to a preconceived philosophy, and then goes on to extrapolate the present processes back into the prehistoric past? Can such extrapolations adequately explain the fossil graveyards and massacre of the Siberian mammoths?

(2) *The Geological Data*: When the starting point is settled, a valid interpretation of the data is necessary—including both that which is consistent, or inconsistent, with one's basic framework. This is frequently an area of uncertainty for as the kaleidoscopic pattern of scientific fact, theory and method pass before the researcher, it is not always easy to mark out the significant and permanent—from the ephemeral. Humility is indeed called for!

(3) *Clear Exposition*: This same attitude is vital when seeking to establish clear exegetical principles and hermeneutics. There are three major interpretations of scripture regarding the age of the earth, from studies of Genesis One. These are the "Gap" theory; the "Day-Age" theory; and the Diluvialists' Catastrophic viewpoint which sees the earth as far younger than that indicated by the Geological Time-Scale.⁸

Conservative Position Versus Speculation

The late Professor E. J. Young brings out the true force of the passage when he wrote:

Genesis 1 is monumental in character, and exhibits a stately cadence of grandeur as it reveals the sovereign Creator uttering His will, and that will coming to immediate fulfillment. So the narrative proceeds until it reaches its mighty climax. The Lord beholds the finished world, and pronounces it very good.

We are not to regard this chapter as the reworking by the Priestly School of a myth that was common to the ancient tradition. Rather the chapter is sober history. Although Genesis does not purport to be a textbook of science, nevertheless, when it touches upon scientific subjects, it is accurate. Science has never discovered any facts which are in conflict with the statements of Genesis 1. . . .⁹

Against the certainty of this account of creation, one often finds opposed the speculative theories of historical geologists. The latter have a major methodological problem. It is pinpointed by the novelist, Francois Derrey:

The formation of the terrestrial crust, the glacial periods, the extinction of species—the earth has hidden these things from us! Science observes, records, clarifies, and studies, but it cannot proceed with certainty from the effects to the causes. All it can do is to propose tentative hypotheses.¹⁰

Even more illuminating are the comments of Jean Lombard, Vice-president of the International Union of Geological Sciences, who says, after mentioning several theories of geological interest or research:

These examples show the uncertainty which characterizes the examination of the earth, the essential point escapes our observation. *A fortiori*, the history of the earth can be reconstructed only with great caution, for who can know what was happening three billion years ago?

Among sciences, geology allows of an exceptionally high proportion of hypotheses, and these concern the very constitution and structure of its object. It is not surprising that numerous contradictory theories confront one another.¹¹

Professor L. King adds that geologists are often reluctant to give up outdated theories. Under the heading, "Some Deadwood—A Digression," he says:

Hypotheses, once promulgated tend to become dogmas that are sometimes difficult to discard, and it is now our painful duty to reject certain current beliefs of wide acceptance among geologists that have outstayed their leave as working hypotheses.¹²

Choice: Uniformitarianism or Catastrophism

Turning now to the theoretical frameworks which are used in historical geology, Derrey mentions that there are two major frames of reference, either that of Catastrophism or Uniformitarianism. This former framework was highlighted at the start of the nineteenth century when Georges Cuvier announced that elephants, mammoths, and many other animals like crocodiles, turtles, sharks, reindeers, bison, beavers, rhinoceroses, and so on, had been discovered under the city of Paris.

Cuvier, the founder of palaeontology, thought that life on earth had been upset by cataclysmic events. Clear evidence for this came from a study of the frozen fossil mammoths found in Siberia. By their state of preservation, it was clear they underwent a brutal and rapid death by freezing. Some specimens found still had undigested vegetation in their stomachs.¹³

Derrey then goes on to show how proponents of the uniformitarian hypotheses have failed to account for these frozen creatures. He quotes Professor F. C. Hibben, who describes the pits of bones north of Fairbanks, Alaska:

The marks of violence are as flagrant as in German concentration camps. We find proofs of atmospheric disturbances of an unheard of violence. The animals were dismembered and thrown around the countryside like pieces of straw, even though some of them easily weighed several tons. The Quaternary ended with the extermination of life . . . not an ordinary end . . . but a total and catastrophic annihilation.¹⁴

Derrey admits that uniformitarianists have not been able to account for all the geological and paleontological phenomena, which are found buried in the rock strata. Nevertheless he says,

Present-day science has chosen uniformism [Uniformitarianism or Actualism] and the actualist postulate by an immense majority. "If we limit ourselves to inorganic phenomena alone, we can be actualist with a maximum of certainty," Professors H. and G. Termier have written. This is typical of the modern scientific position.¹⁵

The origin of uniformitarianism can be traced decisively to Sir Charles Lyell who considered, "the source of geological forces: duration."¹⁶ Lyell thought the earth was in a perpetual state of change, and that given enough time the natural forces acting now, could have created mountains, changed the relationship of land and sea; so changing the face of the earth. Derrey shrewdly comments:

All that had to be done was to attribute several million years to the earth to explain its past by means of the present. Lyell had discovered the key to geology: duration transforms the infinitely small into the infinitely big, inches into miles.¹⁷

It is Lyell's concept of time that is dominant now in geological circles. Leonard G. Wilson, professor of the history of medicine, University of Minnesota, quotes from Lyell's own writings:

If in deciphering records relating to many million, perhaps millions of millions of past ages, we discover much that is irreconcilable with all the popular creeds which exist now and all that have ever existed, it is no sign of our being false interpreters for it will not shake what has been common to the greater number of faiths in all ages and among all races, a belief in the Unity of the System. . . .¹⁸

While most secular geologists have succumbed to Lyell's "calm world" and thinking, historical geologists still have to be content with the fact that the data they use are open to varying interpretations and methodological inadequacies. D. G. Hillier, head of geography and geology, Belleville Collegiate Institute and Vocational School, Ontario, has said,

Historical Geology is based on pieces of scientific information which are interpreted in a particular way by one observer and in a different manner by another. Moreover, when new evidence is brought to light, old theories have to be revised.¹⁹

Contemporary Problem: Ice Age Controversy

A report in *Nature* in December, 1967 on dating of the Ice Age illustrates how specialists on the same geological system—the Quaternary, came to different conclusions. The evidence for dating the Ice Age came from a study of microfossils and varve deposits. The Times, "Nature-Times News Service," summed up the problem in the following way:

Although the last Ice Age is only 10,000 years or so behind us, uncertainty and even disagreement persist about the sequence of events that preceded the last melting of the ice. How long, for example, did the glaciation continue? How many glaciations were there

altogether? And how long were the comparatively warm intervals in between? There seems to be quite general agreement that the whole period of what is called Pleistocene lasted for rather more than 2 million years. Very little else seems agreed upon.²⁰

This latter statement was optimistic, in view of the fact it was soon announced,

Continuing refinements in the techniques of absolute dating have necessitated a further emendation of the time-scale. The duration of the Quaternary is now considered to be 3 million years, while the Pliocene has been pushed back 11 million to 12 million years ago.²¹

From their research, Dr. N. J. Shackleton and Dr. C. Turner, of the sub-department of Quaternary research, Cambridge University, found that by counting the number of layers in the deposits of boulder clay in a narrow trough at Marks Tey (Essex) the top 450 cm. of undisturbed glazed mud in their core contained 4,486 pairs of differently colored layers. They inferred that the data represent many years of deposition in a glacial lake. The Times report of their research mentioned:

By counting more roughly throughout the length of the core, they conclude that the length of the last glacial period is about 30,000 or 50,000 years. This is much less than the estimate produced by the study of ocean sediments, where it seems that the length of this interglacial period must have been 200,000 years.

How difficulties like these will be eventually resolved cannot at this stage be foreseen. One possibility is that the interpretation of the ocean sediments in terms of surface temperature and climate is inadequate. The uncertainties in estimating temperature from oxygen isotopes are also extremely great. Students of ice ages would dearly like to find a more reliable timescale than there is at present.

Thus after decades of research many problems and speculations about the "Ice Age" remain. This position is equally true of the theory of continental drift. Adherents suggest that the continents, made of lighter "sial" rocks, have drifted relatively to one another. The continents are thought to "float" on the heavier basic igneous rocks (sima). The idea is that since the period designated "Carboniferous," what was one large continental mass (Pangaea) has split up and drifted apart, over the course of the geological past.

Problems Facing Theorists

A. A. Meyerhoff and C. Teichert²² are not convinced this continental drifting could have occurred. If the so-called supercontinents of

"Gondwanaland" and "Laurasia" ever existed, then the evidence for former glaciations (in what geologists term the Proterozoic and the Paleozoic eras) could not have taken place. The evidence for these "glaciations" comes mainly from studying the distribution of a "hardened glacial deposit" (called tillite) although not all geologists are convinced these deposits are of glacial origin.

1. The Water Problem

However, the problem arises for these two uniformitarian geologists because the regions where tillite occurs would have been deep in the interiors of these supercontinents. Today, rain and especially snowfall (precipitation) rarely penetrates deep into the arid interiors of continents. The same difficulty applies to the coal deposits, how can forests grow deep within the supercontinent when water supply is inadequate? Meyerhoff and Teichert admit,

Nor could the major Carboniferous, Permian and younger coalfields of eastern North and South America, and of the eastern Africa and India have formed. The presence of major late Paleozoic ice centres in western Australia, central India and northern west Pakistan, Africa, eastern India, Brazil and eastern North America indicates that large water supplies actually were present close to the places where the glaciations took place, and where coalfields formed. This in turn suggests that currently popular reconstructions of Gondwanaland and Laurasia are wrong.²³

2. The Fossil Problem

Other evidence used to show that the continents might have been joined comes from a study of fossil distributions. Here however, the authors state, "For each Paleozoic and Mesozoic faunal similarity 'explained' by joining the continents several dissimilarities are left unexplained. This is particularly evident among the vertebrate faunas."²⁴

3. Misconceptions and Mythology

These former problems are not aided by the development among geologists of what the authors term "misconceptions" especially in connection with the supposed former glaciations.

Although the actual causes of worldwide glacial climates are unknown, many facts about glaciation are known. Despite the increasing knowledge of glaciation, a mythology has grown steadily for 100 years or more—a mythology composed of misconceptions, erroneous beliefs, and misunderstandings.²⁵

One such misconception, according to the authors, is the notion that because ancient tillites are present at the equator, this automatically means that polar wanderings and/or continental

drift have occurred. Another misconception caused by the tillite occurrences at such low latitudes, is that "the geologist finds it difficult to accept the fact that mountain valleys and their associated glacial deposits can be, and have been, preserved—without erosion—for 280 m.y."²⁶ This is indeed an amazing thought, perhaps after all, the geological epochs can be telescoped into a much shorter time span?

The authors then list over half a dozen further examples of this phenomenon of mountains existing for 250-275 million years after the last folding. They add:

An unexpected fact [on uniformitarian principles] is that surprisingly little of the original sedimentary cover of these ranges has been removed by erosion. . . . Therefore, it would seem that the geologist has assumed for too long that his knowledge of erosion and erosion rates is complete; the facts mentioned here show that his knowledge is far from complete and as Jeffreys . . . wrote *something is wrong and it is necessary to re-examine our premises*.²⁷

The former misconceptions must be recognized if progress is to be made in deciphering the past, think the authors. They conclude that

. . . until advocates of the new global tectonics find an alternate explanation for coal distribution, the spreading sea-floor, mobile plate, and polar wandering hypotheses will have to be regarded as interesting speculations which are supported by only a fraction of the known geological, palaeontological, and palaeoclimatological data.²⁸

Other geologists however use the theory to bolster their conception of mountain building (orogenic activity). F. Ahmad says of the theory while discussing the mechanism for mountain-building:

. . . the theory of continental drift has been in existence for over half a century. Recent work on palaeomagnetism strongly indicates that widespread crustal movement has taken place. Such movement of crustal segments could result in compression if two blocks happened to be moving towards each other, crushing between 2 giant jaws any sediments on the continental shelves, and, perhaps accidentally, some on the ocean floor in between. This is believed to have been true of the Himalayas and the Alps. Thus Continental Drift—or crustal sliding as Daly puts it—could also result in the formation of a mountain chain. . . .²⁹

F. Ahmad says, "Daly . . . accordingly concluded that 'after wrestling with the orogenic problem for two centuries, geologists are still

comparing *speculations* about it'. Now holding the field are the classic contraction theory. . . . To these theories may be added the 'oscillation' theory of Haarmann (1930) recently restated by Belousov (1962) and the regurgitation theory of Carey (1958). . . ."³⁰ He continues, "Admittedly most of these theories have been inspired by the tectonics of present mountain ranges, projected back in the imagination through geological history on the basis of uniformitarianism."³¹

This emphasizes the importance of one's underlying philosophic basis, in interpreting past events. Professor L. King claimed that he more or less lets the present processes explain the past. But can one prove that this is a valid projection, especially when uniformitarian geologists claim that the time man has been on earth is comparable to the thickness of a postage stamp on Cleopatra's needle? How typical, or atypical, can we be sure this period is, of former times? What philosophy of landscape development is prevalent at the present time?

Modern Geomorphology

Over the first half of the twentieth century, thinking on the development of landscapes, was dominated by the American geomorphologist, the late W. M. Davis. His approach to the subject is epitomized in the saying, "Landscape is a function of structure, process and stage."

It is true to say that Davis (sometimes labelled as an "armchair geomorphologist") concentrated most of his efforts on the "stage" of development, that a landscape had reached. Textbooks for decades reflected his emphasis on "youth," "maturity," or "old age," and the "cycle of erosion."

J. T. Hack has rightly pointed out that the ideas of W. M. Davis are based on a "closed" system approach according to which the landscape went through certain irreversible, and predictable forms of erosion. Modern geomorphologists have shifted away from this emphasis, in favor of an "open" system approach.

The reason for the decline in Davisian geomorphology is stated by R. J. Chorley, geography lecturer, University of Cambridge,

. . . it must be stressed . . . that modern objections to the Davisian approach have not developed because the cycle has been found to be a totally inappropriate vehicle for geomorphic thought . . . but because its restrictive and highly specialized built-in characteristics have been high-lighted by recent investigations.³²

The cycle of erosion is thus now being recognized as merely one framework within which geomorphology may be viewed, where—in those aspects of landforms which are susceptible to progressive, sequential and

irreversible change through time are especially stressed. . . .³³

Chorley categorically states,

The cycle is no more a complete and exclusive definition of geomorphic reality than the pronouncement by the proverbial Indian blindman on feeling an elephant's leg that the animal is like a tree. What has happened in the last thirty years or so is that, to continue that metaphor, other blind geomorphologists have been feeling the geomorphological elephant's trunk and sides and are variously describing it as being like a snake or wall. It is understandable that the equally-blind "onlookers" should have been confused. . . .³⁴

Ferment of Ideas: "Open" Versus "Closed" System Frameworks

This new way of thinking has led to the dethroning of such familiar Davisian concepts as "grade" in favor of "quasi-equilibrium" (or "dynamic equilibrium") in fluvial geomorphology; the former concept has been penetratingly analyzed by Professor G. H. Dury.³⁵ The whole ferment of ideas has led to controversies basically between the "open" and "closed" system frameworks.³⁶

This situation led S. A. Schumm and R. W. Lichty to attempt to reconcile the two viewpoints. They argued that it was all really a question of time. In the short term a system can be regarded as "open," that is, available for more energy and rejuvenation, but in the long term it was a "closed" system. They state, "Thus depending on the temporal and spatial dimensions of the system under consideration, landforms can be considered as either a stage in a cycle of erosion or as a system in dynamic equilibrium."³⁷

Dr. R. J. Small thinks that limitations of the Davisian cyclical concept and even the dynamic equilibrium theory should be stressed. "Some types of landforms (streams, slopes and beaches) can be appropriately studied in terms of dynamic equilibrium, but there are others . . . [For example, glaciation] . . . to which the concept seems inappropriate."³⁸

The fact remains that geomorphological research has advanced, with a return to empirical investigation and quantification. It could still be argued that Davisian thinking has not greatly aided the subject. This has been shown by the new "process-form" geomorphology which has been used to combat the stranglehold of Davis' ideas. When we try to look at landscape's development in historical perspective, it must be remembered that although it may be possible to mimic some of these events under present-day

conditions, this does not mean that these events must therefore have taken place in the past. Cuchlaine A. M. King says of the "open" system that it

. . . allows a more realistic concept of the influence of time on geomorphological change, which need not be continuous or in one direction; if a steady state is set up then change will not take place with time. The open system model is also useful in that it allows escape from the historical approach to landscape development, in which facets of earlier stages are recognized but most of the landscape tends to be ignored. These facets are not left out in an open system model, but are treated as parts of the landscape not adjusted to present energy conditions. In the open system way of thinking the whole landscape is considered, and studies on this basis can be carried out in any area, whether there are remnants of earlier stages or not.³⁹

Cuchlaine King's final comment on the historical method of presenting geomorphological studies is,

This approach attempts to describe the landscape in terms of historical development, but unless it is linked to some of the other methods [namely inductive, deductive, analytical, topical or systematic and regional] it is unlikely to be of great value.⁴⁰

Chorley makes an even more radical analysis of the cyclic concept and its reinforcements of denudation chronology, which seeks to explain by study of erosional features, the history of past landscapes. He says of denudation chronology,

The former relying often upon highly ambiguous evidence, assumed like the cycle the character of a highly stylized game indulged in by a freemasonry who after committing themselves to certain basic initial steps of faith (e.g. topographical flat means stillstand; higher is older and lower is younger; uplift is generally discontinuous, etc.) reached conclusions which seem often to be *more a product of the means of analysis rather than physical reality*. To adapt an expression of Sauer's ". . . Many studies of denudation chronology look like the products of men set out to 'bag their own decoys'."⁴¹

Dr. R. J. Small simply states, "The denudation chronology approach evidently so popular with British geomorphologists until about the mid 1950's seems to be obsolescent."⁴²

Having seen some of the weaknesses of the historical method, and the attempted reconciliation of the "open" and "closed" systems—as a question of "geological perspective"—one is left

wondering just how important these basic uniformitarian concepts (including cycles) really are, to the subject of geomorphology. The leap forward in the last two decades has come with a welcome return to empiricism.

If Chorley can make a comment about denudation chronology to the effect that a lot of it depends on assumptions and faith approximating to freemasonry, one wonders how much more of historical geology and its reconstructions can be put into the same category: namely, that they are based on assumptions which are either unproved or unprovable.

Comments and Remaining Problems

T. W. Freeman in some general concluding comments on physical geography states that it includes a lot of controversial material. Furthermore, he says that geomorphology must rest on a historical foundation. Secondly, that, "... it is a commonplace that the catastrophic element may be decisively significant in the historical development of landscape."⁴³ Freeman notes that localized floods (such as those of Exmoor) can "do more geomorphological work in a few hours than might normally be done in many decades."⁴⁴

Then, Freeman really gets to the roots of the matter in his summary: "Third, the fascination of geomorphology inevitably rests on its reflection in the landscape of changes that may have taken scores of thousands of years to develop." This is on uniformitarian assumptions. To continue,

The complaint made that W. M. Davis was virtually a crystal-gazer into the past and future may not be without foundation: but modern preoccupation with mathematical measurement, though obviously likely to give fine results as indeed the glaciological work shows, cannot solve all the mysteries of landforms. The statement has been made of the world, there is "no trace of a beginning, no prospect of an end," and for many workers, now as in the past, the interest lies in *the long and visible continuing evolutionary process*. Like so much more in the development of modern geography, [especially geomorphology] *the real impetus came from the Darwinian scientific revolution of the nineteenth century.*⁴⁵

There are indeed many "mysteries of landforms" still unsolved, whilst geologists take refuge in "Lyell's calm world." As Professor H. M. Morris stated, "There are many very important unsolved problems in geology, and it is likely their solution has been delayed by an implicit reliance on uniformity."⁴⁶

We have already mentioned the problems of explaining and dating the Ice Age, the issue of Continental Drift, and the numerous mountain-building hypotheses. The list could be supplemented by the problems connected with: the origin of petroleum; the mechanics of overthrusting; the cause of world-wide warm climates; the nature of vulcanism; the origin of coal; the dry valleys in the chalk; the supposed superimposed rivers on discordant structures; and of accurate, reliable dating methods.

Conclusion

The comment of Freeman underlines Derrey's point that geologists have "chosen" to follow a uniformitarian explanation rather than the nature of the evidence demanding it. Present-day geologists and geomorphologists prefer interpretations in line with the "continuing evolutionary process." Professor G. A. Kerkut's comment regarding biological evolution, seems unhappily true of modern uniformitarian geologists:

He also would take it rather badly when I suggest that he is not being very scientific in his outlook if he swallows the latest scientific dogma and, when questioned just repeats parrot fashion the views of the current Archbishop of Evolution.⁴⁷

It seems that geologists are still unwilling to discard "dogmas . . . that have long overstayed their leaves as working hypotheses." It is to be hoped that the tide will soon turn in favor of a more open-minded approach to geological issues; where ideas are not discarded simply because we have not experienced them in historic time. In view of the continued problems facing geological theorists, it is necessary for geologists to be more flexible in their interpretation of the rock strata.⁴⁸

Modern naturalistic geology is thus shown not to have been proved beyond all reasonable doubt. When scientific theories are elevated to Dogmas, they must be challenged. The words of Jean Lombard ring loud and clear:

Among the sciences, geology allows of an exceptionally high proportion of hypotheses, and they concern the very constitution and structure of its object. It is not surprising that numerous contradictory theories confront one another.⁴⁹

Our challenge to uniformitarian geologists has well been stated in Shakespeare's Hamlet: "... There are more things in heaven and earth, . . . than are dreamt of in your philosophy." These facts should give many the courage to hold fast to the truth, unchanged, and unchanging.⁵⁰

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GRAND CANYON PALYNOLOGY—A REPLY

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Since the paper, "Progress Report on Grand Canyon Palynology," by Clifford L. Burdick (CRS *Quarterly*, 9(1):25-31, June, 1972) was "based primarily upon the first results of their [Dr. Chadwick and graduate students of Loma Linda University] investigation," and yet was published with neither our knowledge nor approval, we feel a few comments from the original investigators are both necessary and desirable.

First we thank Dr. Burdick for bringing the readers of the CRS *Quarterly* up to date on the progress of palynology research sponsored by the Creation Research Society. We are disappointed however that, because we were not contacted directly, some inaccuracies were unfortunately published. It is the purpose of this note then to both make the necessary corrections and give a more complete report of our work.

Dr. Burdick incorrectly implied in his paper that Dr. Leonard Bullas (*not* Bullis) was a part of the Loma Linda team. Dr. Bullas is a microbial geneticist conducting outstanding research in his own field. Aside from his assistance in the initial collection of Grand Canyon samples and continued interest he has not been associated in our palynological investigations.

The personal communication from Lanny Fisk referred to by Burdick (p. 27) was principally concerned with other matters and only incidentally mentioned the Grand Canyon study. Mr. Fisk was in error in mentioning spores being found in the Hermit Shale. This should have read Hakati Shale of Precambrian age. We have thus far been unable to extract pollen or spores from the Hermit, although the Hakati has contained numerous well preserved palynomorphs

some of which have been identifiable. That these may be contamination has not been ruled out.

Dr. Burdick's summary statement that "the Loma Lind** [sic] project largely followed the pattern of the previous work in palynology in the Grand Canyon by Burdick, except that the Loma Linda work seemed to produce a slightly larger percentage of angiosperms than the former work" is somewhat misleading since numbers of identified spores have never been available. Superficially our results do follow the pattern of that reported by Burdick ("Microflora of the Grand Canyon," CRS *Quarterly*, June, 1966).

However our findings diverge from previous results in several important aspects. For instance, dissaccate, vesiculate gymnosperm pollen (*Pinus*) and *Ephedra* are not the most common palynomorphs being found in our samples. Although we are still finding anomalous pollen grains in the Early Paleozoic sediments of Grand Canyon, more recently developed techniques have been used to rule out some types of pollen as contamination.

Any palynomorphs now consistently recovered are almost certainly not contaminants but their significance is yet to be assessed. Even by classical interpretations some spores (i.e. algal and fungal) would be expected. Pollen of angiospermous or even gymnospermous plants however would not be anticipated until later strata.

Because work on the palynology of the Grand Canyon is still in progress interpretations or significances would be quite premature; the only observation that we would like to make here is that our findings neither confirm nor refute Burdick's major conclusions. The current work is adding detailed information which indicates that the pollen story is more complex than previously pictured.

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**This error was made by the Editor.

COMMENTS ON SCIENTIFIC NEWS AND VIEWS

HAROLD ARMSTRONG*

Migration and Magnetism

The way in which birds navigate during their long flights and migrations continues to be a subject of investigation. There is some evidence to show that European robins utilized the earth's magnetic field, but that they rely less on the direction of the field than on the angle of dip, the angle which it makes with the horizontal.¹

As is suggested, this raises a curious question. According to the uniformitarian view, the robins "evolved," and presumably their ability at navigation along with them, over a long time. It is also believed that during this interval of time the earth's magnetic field has changed in direction, or reversed, several times. It would seem that the change should have upset the (proto-) robins' ability to navigate just when it was becoming established.

The author attempts to suggest ways around the difficulty, but they are not very convincing. Indeed, there is the initial difficulty of explaining how the ability to navigate could have evolved; it needed to be about perfect to be of any use at all.

Creationists will find no difficulty. The birds were created with their special difficulties. As for the "magnetic reversals," if they do not represent something completely different, they all happened in a relatively short time, likely during one major catastrophe. Thus there was not long enough for the birds to lose their ability at navigation before the earth's field was established more or less as it now is.

Migration After the Flood

Anyone who reads French, and has access to the journal, *La Recherche*, might find an article on the migration of birds interesting.² The article is not creationistic, nor does it provide any explanation, evolutionary or otherwise, of the origin of migration. But it does provide many facts, and some very excellent pictures.

It is proposed that one result of migration is to make room for more kinds of bird, since different kinds use the same territory at different times. But if this diversity is to be proposed as a cause of migration, it must be a final cause. Creationists do not object to final causes, and, in fact, believe in them; but the evolutionary theorists are reluctant to admit any such thing.

The creationistic explanation, which has been proposed before, seems to be both adequate and simple. When God created the birds, in order that their great mobility might be of the most

use to them, He gave them powers of navigation, to various degrees.

After the Flood, when conditions had changed and perhaps the change of seasons had begun, some birds found it useful to build a new way of life around these abilities. Nor should we be surprised that some creatures, other than birds, migrate.

For over and over again we see that when God has given some feature or ability where we might expect it; we are likely to find that He has also given the same thing, perhaps to a different degree, in another place where we should never think of looking. But, when we come to think of it, to say this is just to say that we can never anticipate all of God's work—and who ever supposed that we could?

Selenium Essential

Every now and then we find that another element is a "trace element": that it is needed, in very small amounts, for proper health. There is now evidence that selenium is one of these.³ The need of selenium seems to be connected somehow with an organism's use of vitamin E; and lack of it has shown up especially in livestock, by such symptoms as muscular dystrophy.

Is it not to be expected, on the basis of creationism, that we should find that practically all of the elements have some function? For the Earth was made "to be inhabited"; and it was made out of things which would be useful to the inhabitants.

On the other hand, surely were evolution true, one would expect to find that living creatures would need only a few elements. For surely those that needed the fewest things would be more adaptable; they would get on better under a greater variety of conditions, and ability to get on under different conditions is a favorite virtue of evolutionary theorists. They would, in evolutionary terms, be "fitter."

But that is not what we find; rather, creatures need a great variety of things. Is that fact, then, not evidence to show that the creatures are the result, not of evolution and selection, but rather of the design of a Designer; a Designer, moreover, Who made His material to suit the creatures which He was planning to make?

All Elements Useful?

Some more information has now appeared on the elements which are necessary, or at least important, to life. Fluorine, silicon, tin, and vanadium have been added to the list, bringing the number up to twenty-four.⁴ It is not just clear yet what some of these do, but the evidence

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seems to show conclusively that they are important for some reason.

Is it not likely that we shall find eventually that all of the elements, or very nearly all of them, are useful, if not necessary, to some living beings? By "useful, if not necessary," I mean that, while it may be possible to live without some of them, it will be found that the creature concerned lives better with them.

By "some living beings," I mean that, while we may not need, or use, them all, we shall find that some animal or plant does. For the world was made to be inhabited, by us, by animals, and by plants. And the various elements of which the world is made are some of the features which make it suitable to be inhabited.

The author of the article in which this information was given seemed to consider it necessary to mention evolution. But evolution has nothing to do with it; the fitness of everything speaks much more strongly for design and teleology.

Indeed, the author says it is strange that, if life evolved, it should have been based on carbon, rather than on silicon, which is much more abundant. Creationists can see that there is no problem here; carbon was made to serve as a material for living things, silicon (along with other possible uses), to serve as a material for the face of the earth. Because of the great extent of the face of the earth a more abundant material was provided.

Cell Wall Complexity and Creation

A recent review article on organic macromolecules could be of some interest to creationists. Not only are the macromolecules of interest in themselves, but also one must consider that, being complicated as they are, they are only components of living things, which are then much more complex. The author says, in part:

... it is surprising what has recently been discovered about such "primitive" and simple things as a bacterial cell wall. The wall appears to be a fabric of criss-crossed polypeptide and polysaccharide chains linked to several other molecules ... some of the amino acid residues ... are of the unnatural D configuration. The purpose is clear: this provides protection against the common proteolytic enzymes ... in a dividing microbe it (the structure) continuously disrupted and rebuilt. We are very very far from understanding all this.⁵

It should be noticed that it is impossible to discuss these matters without mentioning a purposer. For there cannot be a purpose unless there is Someone Who has the purpose.

From the clever structures just mentioned, it can be seen that the Purposer's skill is very great. If, on the other hand, the Purposer had really

posed. But once purpose be admitted, materialistic evolution may as well go out the back door. relied on the incredibly clumsy and wasteful methods proposed by evolution to reach the present state of affairs, He would hardly have been showing much skill. Here, as in many other places, evolution leads into a clear contradiction.

There are some remarks on notions about the origin of life, among which we find:

... Oparin ... dispelled the over-optimistic hopes of many (of explaining or imitating the beginning of life). ... The simple viruses have been considered by some as the possible precursors of living cells, a wrong assumption that is refutable by considering the nature of viruses. A virus is not alive, it is only a complex of macromolecules. ... It cannot grow and replicate in vitro ... neither should a simple macromolecule of DNA be considered as a primitive form of life, because "it lives" only in the presence of enzymes and a whole series of other molecules. ... The gap between ... hypothetical prebiological systems and a microbe, as we know it now, is much greater than between the microbe and a vertebrate.

Notice the statement: "... not alive ... only a complex" In other words (and contrary to what has sometimes been at least implied), complexity does not equal life.

While the statement is not made in so many words, what is really said here is that it is impossible to explain the origin of life in any naturalistic way. But it must have been either natural or supernatural; any attempted naturalistic explanation simply will not work, so it must have been supernatural.

Once this is accepted, the whole structure of evolution falls to pieces. For if a supernatural cause is necessary to account for the origin of life, is it not likely that the same cause could account for its diversity? On the other hand, to admit that the Creator originated life, and then to appeal to evolution to diversify it, would be a violation of the principle of Ockham's razor. Here, as elsewhere, an explanation according to creation is both simpler and more reasonable.

Effects of the Fall

Recent discussions, in the *CRS Quarterly* and elsewhere, has appeared on the question of whether any animals were subject to death before the fall, and whether at that time they all lived on vegetables. May I suggest a few lines of thought about these matters?

First of all, as to the diets of various animals before the fall, even though they might find it hard to live on a diet of vegetables now, it does not follow that it would have been so hard then. For there may have been vegetables, which are

now extinct, which would have suited, e.g. lions, quite well. We ourselves, e.g., would not care so much for a diet of lettuce; the addition of some beans would make things much better.

If there were such plants, they may have been destroyed by the flood, or by conditions thereafter; or maybe shortly after the fall. Maybe they could not compete with the "thorns and thistles." Perhaps, in fact, the destruction of such plants was what caused some animals to turn to eating meat.

If, then, all animals originally lived on vegetables, the question whether any were subject to death before the fall comes down to two points. First, when it is said that death entered the world, does that include the death of animals? In the second place, what about accidents, which would surely have happened to them?

As for the accidents, surely they would have happened to human beings also. Yet, it is agreed that the human beings were not subject to death, so the argument about accidents would not seem to prove anything. It may be that accidents, both to human beings and to animals, would have been avoided outright, or else their effects repaired, by miracles (which, notice, under those circumstances would not have seemed particularly miraculous), as necessary.

C. S. Lewis suggested somewhere that our Lord was able to do His miracles, not only because He was God, but also because He was not a fallen man. Adam's powers, before he fell, may well have surpassed anything that we can imagine.

It would appear that the death of a man, and the death of an animal, are considered in scripture to be commensurable to some extent. If this were not so, it is hard to see how an animal could substitute for a man, in sacrifice. But if they are somewhat commensurable, then it would seem that the scriptural teaching that there was no death before the fall would extend to animals.

Since the matter could be considered raised by the discussion, above, of the possible extinction of some plants, may I mention one more point? Wine is first mentioned in scripture after the flood; thereafter it is mentioned occasionally. Sometimes it is mentioned as a necessity of life, but there are many warnings against excessive use.

Is it possible that the reason that wine did not come into use until after the flood is that it was not needed before? After the flood the changes in seasons, the extinction of some plants, and such reasons, may have raised the problem of preserving food for part of the year. Such things as grain can be kept easily enough; but in ancient times there was no way of keeping fresh vegetables.

Did the wine, in fact, correspond to preserved fruit juice? Would the only way of preserving involve letting fruit juice ferment until there was enough alcohol to act as a preservative? At least some of the value of the juice, the minerals, vitamins, etc., might have been saved thus.

If these suggestions are true, we can see why Noah had trouble with wine. He did not know what it would do; it was something new. Again, if these suggestions are true, the reasons why scripture mentions wine with approval in some places would not apply so strongly to our present situation. For we are able to preserve things by canning and by freezing.

Moreover, it would seem to be wine, above all other alcoholic beverages, which would serve a useful purpose in the way suggested. Beer, one would expect, would contain much less of the vitamins, minerals, etc., and distilled liquors practically nothing.

C-14 and Hard Water

Evidence continues to accumulate to show the caution that must be used in trying to determine the ages of things from radioactivity.

As for rocks, which some attempt to date by measuring the amounts of various isotopes of an element, one of which has to do with a process of radioactive decay, a great difficulty is that weathering, leaching, etc., may affect the amounts more than the radioactive decay did. In a particular case, in which a rock, which had evidently been affected by weathering, was investigated for isotopes of strontium, researchers concluded that "... we cannot predict whether completely weathered products will show a net increase or decrease in the $^{87}\text{Sr}/^{86}\text{Sr}$ ratio. . . ." At best, the ages obtained "... by regression of scattered data provide a general idea of the antiquity. . . ."⁶

As for radioactive carbon, an effect which seems to have been known for some years, but mentioned very little, is that due to the presence of hard water.^{7, 8} The point is that the hard water contains calcium carbonate or bicarbonate. The age and composition of the carbon combined with the calcium may, of course, have nothing to do with the samples being investigated. Thus errors may arise. The investigations mentioned show that this effect can make samples seem 1,000 to 3,000 years older than they really are.

It seems plain, then, that with the carbon it is possible to get fairly good results back to about 1,000 B.C., if proper precautions are taken. Beyond that, things become much more uncertain. As for the other materials used, the isotopes of strontium, lead, etc., there are so many sources of error that one begins to wonder whether it is really worth while to continue to spend time on these methods.

Lead Ratios and the Age of Coal

As is well known, when there are minerals which contain several isotopes of elements, and some of these isotopes are formed or decay by radioactivity, investigators often attempt to deduce the age of the mineral from the ratios of the amounts of the various isotopes.

However, there are many snags; in many cases the method has given completely absurd results, as has been commented on from time to time in the *Quarterly*. Now another experiment has given some results along these lines, which should be interesting.^{9, 10}

The results are a by-product of attempts to investigate sources from which lead is released into the air. Much of it comes from gasoline, to which lead was added for anti-knock purposes; but some comes from coal, in which the lead occurs as a natural impurity. The isotopes concerned were lead 204, 206, 207 and 208.

Researchers have found that all of the coals investigated were richer in radiogenic (produced by radioactivity), lead than the average composition of the continental crust. "Lead ratios bore a relation neither to the age of the plant deposits from which the coal came, nor the date when they were converted into coal." It is suggested that the coal "acquired its final lead composition by geochemical processes."

There are two remarks which might be made. In the first place, here is another case in which ratios of isotopes prove to be a very unreliable way of estimating ages. Indeed, the method is so unreliable in so many cases that one might wonder why anyone bothers trying it.

In the second place, it is no wonder that the ratio of isotopes bore no relation to the (alleged) age of the coal. For the alleged ages, of course, were those which are according to the uniformitarian theory, and creationists know how much faith to put in that.

But, since in fact the coal was formed by a relatively recent catastrophe, it is not surprising that its content of lead—and likely of other things, too—should vary considerably according to circumstances.

Incidentally, if the coal "acquired its final lead composition by geochemical processes," surely the same thing could happen with isotopes of other elements. But if that is admitted, then the whole notion of finding ages from the ratios of isotopes can be doubted.

Catastrophic Genesis of Oceans

The question of the origin of the oceans is one example of the many cases in which the uniformitarian theorists get into trouble. For they assume that the Earth was once molten, or in some condition in which oceans would have been impossible. Yet plainly the oceans are now here. How?

Some have suggested that the water for the oceans came from the interior of the earth. Clearly some does so nowadays, in the form of steam from volcanoes; but it might be that the water for that steam had earlier seeped underground from the ocean.

Authors of a recent study conclude that the oceans are not now, and have not been for a long time, receiving much water from the interior. The investigation was based upon the ratios of the isotopes oxygen 16 and 18, which differ according to the origin of the water. Moreover, it is proposed, some record of the former state of affairs is left in sedimentary rocks. Anyway, it is concluded that the evidence points to a "... catastrophic early degassing of the earth and early formation of the oceans . . . (there is) no significant growth of the mass of water in the oceans."¹¹

Here is another example in which even authors who want to be uniformitarian have to mention catastrophes. But many creationists, who believe that a considerable portion of the present oceans is left over from the flood, have been saying for a long time that the origin was catastrophic.

There could even have been a "degassing." For when the fountains of the great deep were broken up, it is quite possible that enormous amounts of steam escaped from the interior, to fall later as rain. It is said that in some volcanic eruptions, the condensing steam causes local torrential rains. To say this is not to deny that much water may have come also from the canopy; both sources may well have been involved.

So here again creationistic interpretation is in perfect accord with the evidence, while uniformitarianists find themselves in trouble.

Stellar Composition Violates Evolutionary Predictions

Some writers give the impression that stellar "evolution," and the "evolution" of the elements themselves, from some "big bang" long ago are established facts. Actually these notions are founded largely on conjecture; and even with all the effort that has been expended to make them work there are many difficulties. Some of these difficulties are made explicit in some recent works.

Overabundances of several elements have been detected in certain stars, i.e., there is more of the element than the theorists would expect.^{12, 13} In fact there is about one thousand times "too much" of the rare earths, molybdenum, and niobium; about one hundred times too much strontium and zirconium, and around ten times for the "iron-peak" elements. Aluminum and silicon are also too plentiful, but not to such a spectacular extent.

These peculiarities do not fit in with any of the popular theories of origins; and one of the authors concludes that the cause for this state of affairs cannot be found at present.

Since the actual state of affairs is contrary to the theory, clearly something is wrong with the theory. Of course, creationists have known that for a long time, but here are new findings that can be fitted into creation theory; God was well able to put into each star whatever He chose. The difficulty with the evolutionary theory here is the same as elsewhere: in order to avoid a Creator evolutionists try to have things create themselves. For a few simple things some such theory can be contrived, but evolutionary theory fails miserably when application is attempted to the whole of creation in all of its complexity.

A Shift in "Red-Shift" Theories

It is supposed sometimes that the size of the universe, and its expansion, is a difficulty for Christians, and especially for creationists. For my part, I cannot see why this should be; God's arm is not shortened; He could make a large universe as easily as a small one, an expanding one as easily as a stationary one. It is worth noticing, moreover, that many of these notions about the universe are based on rather slight evidence, and might be discredited tomorrow.

It has been suggested, for instance, that the "red shift," which is supposed to show that the universe is expanding, means nothing of the sort.^{14, 15} Rather, it is suggested that what may be happening is some interaction of light with light—a "photon-photon interaction"—which makes the light that we receive from some of the stars redder than it would otherwise be.

This, of course, is highly speculative. Yet, when one comes to think of it, it is scarcely more so than the adopted theory. Anyway, it may be worth while to remember that, what the Psalmist says about the ungodly,¹⁶ may very well describe the ultimate fate of theories which are in opposition to God's Word.

"Light-Years" Disappear

It is proposed sometimes that the universe must be millions of years old, because we can see stars that are millions of light-years away. Of course, any such claim can be met with the doctrine of creation with apparent age; but there may be another answer.

In the first place, the distance to the stars is not measured at all directly. Many assumptions go into the production of the figures which are quoted. The figures of millions of light-years might turn out to be greatly exaggerated.

There is another possibility. Dingle, the noted philosopher of science, has revived a suggestion

made by Faraday (who, incidentally, was a devout Christian). In order to avoid some difficulties concerning the Doppler effect (the change in the wavelength when the source is moving), Dingle suggested that light may, in some sense, consist of "rays" extending out from each atom, there being some sort of vibration in the rays.¹⁷

The rays would, in a very real sense, be part of the atoms, and thus of the star concerned; it would be natural, then, to suppose that the whole thing (rays and all) was created at the same time. And the rays, then as now, extended to the earth (and beyond, for that matter). Faraday, as was mentioned, suggested something like this, but apparently never developed the idea much.¹⁸

As for the doctrine of creation with apparent age, however, there are no particular problems; for clearly in some cases it has happened. Adam must have been created as an adult. In his case it is easy to see the necessity; there are likely many other cases which are not so apparent.

For instance, was the original soil created containing bits of leaf mold, and other humus? It appears that the humus is necessary if the soil is to serve properly for plants. Yet the humus would give the soil an apparent age.

It is possible that the same kind of thing could be said about the stars. For the parts of the universe interact; the sun, for instance, holds the earth in orbit at the proper distance. Mach and others have proposed that the very fact of inertia (try to imagine life without it), depends on interaction with the universe as a whole. It is commonly believed, also, that these interactions propagate at the speed of light.

If this is so, an orderly universe could not have existed for millions of years before the interactions were established; it would have been in chaos long before. So these interactions, which propagate at the speed of light, as the universe now works, had to be made at creation. In other words, there was an apparent age. And what applied to the other interactions, or fields, might reasonably enough be expected to apply to light.

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BOOK REVIEWS

The Early Earth by John C. Whitcomb, Jr. 1972. Baker Book House Company, Grand Rapids, Michigan, 144 pp. \$1.50.

Reviewed by George Mulfinger.*

Whitcomb's *The Early Earth* should prove a very welcome addition to creationist literature, enabling the serious minded student of the Bible and science to fortify his library in an area that is often slighted in books on creationism. In five solidly packed chapters Whitcomb presents the Biblical alternative to the "cosmic evolution" view of the origin of the earth and its inhabitants. Those who have read and appreciated Dr. Whitcomb's earlier works will not be disappointed. His approach is uncompromisingly scriptural.

The Early Earth is remarkably comprehensive, touching on such topics as the nature of Creation, astronomical theories, the geologic timetable, the creation of plants and animals, theistic evolution, the antiquity of man, the day-age theory, the gap theory, and the double revelation theory.

Whitcomb's approach to astronomy is a refreshing relief from the mythology of the day: "... nor do any of us have the privilege of watching worlds being created today!" (p. 42) We live in an age in which astronomers imagine every nebula to be a veritable "maternity ward" in which stars and planets are hatching into being before their very telescopes. Yet somehow they always seem to be boasting of what they are going to see, rather than what they actually are seeing or have seen.

Various evolutionary theories of the origin of the earth are weighed and found wanting. Such speculations are shown to be irreconcilable with Genesis and beset with many insuperable difficulties from a scientific standpoint. (pp. 41-58) Here are the all-too-infrequently-heard facts of

the matter—an effective antidote to the pseudo-scientific guesswork of the theorists.

The Early Earth contains one of the best discussions of "creation with apparent age" (or "superficial appearance of age," as the author prefers to call it) this reviewer has seen to date. His position is sharply antithetical to those who consider this doctrine to be some kind of theory that can be accepted or rejected at will. He sets the tone for this section with the statement, "In the first place, if this doctrine were not true, there could have been no original creation by God at all." (p. 29) Regardless of what God might have chosen to create, the carnal mind of man could undoubtedly devise some kind of evolutionary history preceding it to "explain" it.

To the person who thinks he sees such a history in a newly created object it will appear to have "age." Whitcomb shows that many of the New Testament miracles, as well, involved the creation of an appearance of history, and that this feature was an inherent and vital part of the divine act in each case. This section alone is worth the price of the book.

With a few deft strokes Whitcomb demonstrates the absurdity of the theistic evolution position. The crux of the matter is contained in this statement: "To the extent that theistic evolutionists bother with the Biblical text at all they insist that the dust of the ground from which God formed Adam was *living* 'dust' and is thus symbolic of the animal kingdom." (p. 104)

If "dust of the ground" can be twisted to mean "animal body," two very formidable problems arise in connection with Genesis 3:17-19. We are forced to conclude that animal bodies bring forth thorns and thistles, and that man returns to an animal body when he dies! (p. 105) And if the theistic evolutionist can somehow bypass these obstacles, he is immediately faced with the unmistakably supernatural creation of Eve from Adam's side in Genesis 2:18-25.

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It is of no avail to rate the writings of Moses as any less trustworthy than the New Testament scriptures; Paul echoes the same truth in I Cor. 11:8—"For the man is not of the woman; but the woman of the man." (p. 104) If Eve was the daughter of an ape, scripture cannot retain any semblance of authoritativeness or reliability.

There is also the question of sin and death. If we are to imagine countless generations of apes preceding Adam, the theological inconsistencies reach unconscionable proportions. Adam's sin, according to Romans 5:12, brought death into the world. Yet theistic evolution posits a whole lineage of dying apes *prior to man*.

In order for God to change a mortal ape into a sinless and therefore immortal man, who had sufficient vigor to live 930 years even after the Fall, a physical as well as a spiritual miracle had to occur. But once we grant the necessity of such a physical miracle in Adam's creation to preserve some of the essentials of Christianity, why shouldn't we take the text of Scripture as it stands and grant that God created Adam's body directly? (pp. 102, 103) Whitcomb thus effectively demolishes the groundwork for much of the nonsense that is passing for scholarship in certain sectors of evangelical Christianity today.

Closely akin to the theistic evolution question is the so-called double revelation theory. The author neatly refutes this as he did in an earlier work, *The Origin of the Solar System* (Presbyterian and Reformed Publ. Co., Nutley, N. J., 1964). Proponents of this view begin by stating that we have been given *two* fully authoritative revelations from God—the revelation of God in Scripture and the revelation of God in nature. Each is said to be completely trustworthy in its own realm. This sounds splendid. But in practice all conflicts are resolved by annihilating the portion of Scripture in question in favor of some scientific theory or hypothesis.

The theologian must rethink his interpretation at these points in such a way as to bring the Bible into harmony with the general consensus of scientific opinion since the Bible is not a textbook of science, and these problems overlap the territory in which science alone must give us the detailed and authoritative answers. (p. 97)

In the final analysis, then, advocates of the double revelation theory do *not* trust in two revelations, but only one. "... Natural revelation, as interpreted by the scientist, cannot long remain on an equal footing with special revelation in Scripture, but finally supersedes it entirely." (p. 99)

Concerning the question of the antiquity of man, Whitcomb asserts that gaps *can* be found

in the genealogy of Genesis 11, but by Biblical analogy these must be relatively minor gaps compared with the hundreds of thousands or even millions of years demanded by most present-day anthropologists. Thus no satisfactory accommodation to evolutionary chronology can be effected by stretching the genealogies. (pp. 107-111)

Other attempted harmonies such as the day-age theory and the gap theory are discussed and rejected. (pp. 28, 47, 64, 115-134) The sedimentary strata of the earth's crust must, then, be understood as effects of the great Deluge rather than gradual processes over long ages. (pp. 46, 66, 68)

The Early Earth is recommended for general reader and scholar alike. The Christian man of science should peruse this work and think through the requirements of a truly scriptural framework in his own particular field of endeavor.

The book is attractively put together and includes 16 full-page photographic illustrations of high quality.



The Paradox of Olbers' Paradox by S. L. Jaki. 1969. Herder and Herder, New York. 269 pp. Price \$9.50.

Reviewed by Harold Armstrong.*

Olbers' Paradox is related to the science of astronomy. What might be called the "paradox within a paradox" concerns the persistent failure of people for centuries to see that there was something wrong with their own world-view.

The ancients, with a few exceptions, considered that the universe was finite. By Newton's time, and even earlier, it was considered, sometimes tacitly, to be infinite. Immediately a problem arose—or, rather, should have arisen.

If the universe be infinite, but the stars limited to a finite region, then the stars should all have collapsed together by gravitation. If, on the other hand, stars are distributed more or less uniformly to infinity, the night sky (and daytime too!), should be as bright as the sun.

In fact, this problem was hardly noticed until Olbers stated it in 1823. For some time thereafter, a favorite solution was to say that the light of the more distant stars was absorbed, either by interstellar material or by the luminiferous ether itself. Of course, such a solution is in conflict with thermodynamics; eventually the absorbers would become as hot as, and glow as brightly as, the stars themselves.

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The author considers that the problem was not solved until the introduction of general relativity, which, in a sense, restored the finite universe. From this viewpoint, the fact that the consequences threatened in the paradox do not happen would be a powerful argument in favor of general relativity, or some more or less equivalent theory.

The author is not, as far as I know, a creationist. Yet, especially toward the end, the book contains many thoughts which are almost identical with things that creationists should say: about the danger of people who become so set in their own so-called scientific world-views that they apparently fail to notice difficulties or even contradictions to their views. As the author says:

... scientists usually pay attention to ... questions that fit into the ... world picture prevailing ... very pertinent and grave problems concerning that ... world picture may be ... overlooked ... the scientific enterprise too has its foibles, biases, and myths. Far from being the always dependable ultimate arbiter of any or all issues ... science does not necessarily recognize ... problems which are its own ... science ... needs its own school of criticism. ... pp. 244 and 245.

The theory of the "steady state," or "continuous creation" (which, indeed, seems to be losing ground by now anyway), is criticized sharply. Jaki points out that:

It amounts indeed to a perverted theology to postulate the creation of one hydrogen atom per litre in one billion years and deny theologians at the same time ... to emphasize ... the creation of hydrogen atoms ... is to inject into physics an atheistic theology based on the self-contradictory concept of *creatio ex nihilo* without a Creator ... the ultimate motivations of the Steady-State Theory are flowing from ... antagonism to theology. p. 239.

The author states as his own conclusion about the astronomical problem, "The only solution for Olbers' paradox is the ... acceptance of ... a universe finite in space ... most likely also finite in time, because of the ... necessity of taking entropy into account." p. 240.

The similarity of these remarks to things which creationists might say need not be pointed out. It may, however, be worth while to comment on two analogies which might otherwise go unnoticed.

First of all, Olbers' Paradox concerns infinities, and why there is not an infinity of starlight. We might ask why, if there have been a whole infinity of kinds of living things in the past, ranging continuously from the most "primitive" to the most "advanced," why then do we not find an infinity of different kinds of fossils? In fact, we find only a finite number of kinds. Just as Olbers' Paradox is evidence for a finite universe, so the fossils are evidence for a finite number of kinds of creatures: the created kinds.

In the second place, the same second law of thermodynamics, which assures us that the (hypothetical) absorbing interstellar material could not go on absorbing and absorbing and becoming hotter and hotter, also (when stated in a slightly different way), assures us that some "primitive" form of life, which had become started somehow or other, could not go on becoming more and more highly organized.

There is a certain unity to all nature, because it is the work of one Creator. A method, or world-view, that does not deal with one part is not likely to be very successful in dealing with another. The kind of world-view which led to Olbers' Paradox in astronomy (or, rather, failed to see that it was apropos), has a certain resemblance to the one which generated the theory of evolution; and the results in both cases are equally unsatisfactory.

LETTER TO THE EDITOR

More Regarding Flatworms

Regarding Dr. White's criticism of my review of Rosenfeld's book (C. R. S. *Quarterly*, Sept., 1972, p. 143) I should like to deny that "it has been shown that feeding trained planarians to untrained planarians increases the rapidity of learning in the untrained planarians" as White asserts.

The fact is that the result "cannot be replicated in laboratories other than those in which they were first described" (Robert Efron, "Biology Without Consciousness and Its Consequences," *Perspectives in Biology and Medicine*, Vol. II, Nov. 1, pp. 9-36.) The reader may also consult articles by Hartry, Keith-Lee and Morton (*Science*, Vol. 146, p. 274); Luttges, Johansen, Buck, Holland and McGaugh (*Science*, Vol. 151, p. 834); Gross and Carey (*Science*, Vol. 150, p. 1749); Brown, Dustman, and Beck (*Physiological Behavior*, Vol. 1, p. 305.)

Second, I repeat that propositions such as "memory is stored chemically" are utter and complete nonsense. William James defined "memory" as "the knowledge of an event or fact, of which meantime we have not been thinking, with the additional consciousness that we have thought or experienced it before." (*Principles of Psychology*) "All that is necessary for our present

purposes is to recognize that the concept of 'memory' depends upon and presupposes the concept of consciousness" (Efron, *Ibid.*).

Memory is not an epiphenomenon, it cannot be reduced to a chemical; it cannot be "stored chemically" and then injected or fed to another organism. To entertain such ideas is *prima facie* evidence of enormous epistemological confusion, in this case effected by behaviorism and its scientific allies.

Mind is not matter; consciousness is not molecules, nor can it be reduced to or explained by the actions and interactions of chemicals.

A scientist interested in computers [which are only matter] would not conceive of the idea that he could chop up a computer into its electronic components and then sprinkle these resistors, capacitors, and diodes at random into another computer in the hope that the second computer would perform its calculations faster or with fewer errors. It is absolutely incredible that a biologist could conceive that memory might be transferred in animals or man by such a technique. (Efron, *Ibid.*)

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1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all 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 the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

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

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