

# CREATION RESEARCH SOCIETY QUARTERLY

VOLUME 7

MARCH, 1971

NUMBER 4

## EDITORIAL BOARD

George F. Howe, Editor

Walter E. Lammerts, Research Editor

John N. Moore, Managing Editor

Department of Natural Science

136 Brody Hall, Michigan State University, East Lansing, Michigan 48823

Donald O. Acrey ..... Geophysicist, Amarillo, Texas

Thomas G. Barnes ..... University of Texas at El Paso, Texas

John W. Klotz ..... Concordia Senior College, Fort Wayne, Indiana

Henry M. Morris ..... Creation Science Research Center, San Diego, California

William J. Tinkle ..... Anderson College (retired), Eaton, Indiana

John C. Whitcomb ..... Grace Theological Seminary, Winona Lake, Indiana

\* All manuscripts submitted should follow Style Format published in Vol. 4 (Dec.), p. 88 \*

Notices of change of address, and failure to receive publication should be sent to  
Wilbert H. Rusch, Sr., 2717 Cranbrook Road, Ann Arbor, Michigan 48104.

## TABLE OF CONTENTS

(Contents, or parts thereof, may not be reproduced in any form without  
permission of the Editors or author of an article.)

|                                                                                 | Page |
|---------------------------------------------------------------------------------|------|
| Editorial Comments .....                                                        | 191  |
| Comments from President Morris. ....                                            | 191  |
| The Cyclical Black Shales. ....                                                 | 193  |
| Walter G. Peters                                                                |      |
| Human Footprints in Rocks .....                                                 | 201  |
| Wilbert H. Rusch, Sr.                                                           |      |
| A Geo-Ecological Explanation of the Fossil Record Based upon Divine Creation. . | 214  |
| Randall Hedtke                                                                  |      |
| The Mesa Basalt of the Northwestern United States .....                         | 222  |
| Stuart E. Nevins                                                                |      |
| Dooyeweerd and Creationism. ....                                                | 227  |
| Samuel T. Wolfe                                                                 |      |
| Universities and Colleges Having the Creationist Point of View. ....            | 229  |
| Walter E. Lammerts                                                              |      |
| Comments on Scientific News and Views .....                                     | 231  |
| Harold Armstrong                                                                |      |
| Book Reviews .....                                                              | 239  |
| Article Review .....                                                            | 241  |
| Filmstrip Review .....                                                          | 242  |
| Letter to the Editor .....                                                      | 242  |
| Letters to Research Chairman. ....                                              | 243  |
| Erratum .....                                                                   | 243  |
| Index: Volume7 .....                                                            | 244  |
| John N. Moore                                                                   |      |
| Note on Human Aggression — No Monkey Business. ....                             | 246  |
| George F. Howe                                                                  |      |



## EDITORIAL COMMENTS

Geology and Biology have long been bastions of evolutionary theory. In geology particularly there has been little opposition to the materialistic dogmas of uniformitarianism and evolutionism. Readers of the *Creation Research Society Quarterly* have been well aware, however, that there are some geologists who openly foster creationism. The growing body of creation literature in geology receives a significant boost in this issue because each of the four major articles centers on some aspect of that very field.

In "The Cyclical Black Shales," Mr. Walter G. Peters introduces an important addition to the literature of micropaleontology and also asserts that his data support a biblical understanding of earth history. It is obvious that this paper represents months of careful field and laboratory research. It is also obvious that the creation-catastrophe view has helped and by no means hindered Peters in his thorough analysis.

Certain men such as Professor Wilbert Rusch, Sr., and his colleague Professor Richard Korthals, contribute generous amounts of time and energy "behind the scenes" caring for details of membership and finances in the Society. In addition to such "regular" assistance to C. R. S., this month Wilbert Rusch, Sr., has made his extensive study of footprints available for publication. As interest in fossil footprints increases, this article will foster a full-orbed understanding of how some impressions may originate in rocks and of the care which must be taken before a particular impression can be classed as a valid human fossil.

In a fascinating review article, Mr. Randall Hedtkke shares several principles by which the record of geology may be interpreted. Using these principles, the author demonstrates good fit between the strata and the Biblical concepts of creation and the flood.

A young geologist, Stuart E. Nevins, in his paper, "The Mesa Basalt of the Northwestern United States," relates these massive deposits to flood and post-flood times. The very idea of a flow which averaged 30 feet in depth over an area of about 100,000 square miles calls for catastrophic explanation as Nevins has so ably shown.

The reader will discover some short but valuable sections in this *Quarterly*. Students of the work of Herman Dooyeweerd of The Netherlands will appreciate Mr. Samuel Wolfe's analysis of Cosmonomic philosophy in the light of creationism. Dr. Walter E. Lammerts presents Grace College in an article by Mr. Messner. Professor Harold Armstrong introduces a wide array of reflections on articles from the current literature of science. His comments on Dr. F. Ivanhoe's paper in *Nature* point to the likelihood that the typical "Neanderthalian" characteristics of certain fossil races probably resulted from severe and continued manifestation of the disease rickets in ancient man!

Several reviews of books, articles, and a film strip, plus letters to the research chairman, round out an issue that should help fill missing pages in the annals of geology.

One would expect that it would be possible to formulate a well-rounded Biblical Christian view of earth science because Job recommended that we "speak to the earth . . ." that it might teach us (Job 12:8). The best in creation research is exactly that—asking careful questions about God's created works by means of designing skillful experiments. One must then listen for answers by gathering data and interpreting them within the framework of His inerrant revelation, the Bible.

GEORGE F. HOWE,  
*Editor*

---

## COMMENTS FROM PRESIDENT MORRIS

I hope all of our members by now have seen the new book, *Biology: A Search for Order in Complexity*. This is our long-awaited Creation Research Society biology textbook, and it has proved well worth waiting for! It is an outstanding book in terms of accuracy, completeness and teachability, as well as meeting the urgent need for a biology text favoring creation instead of evolution as the true philosophy of origins. On top of all this, our publisher, Zondervan, has done a beautiful job of production on the book. It is already evident, from early reviews and reactions, that it is going to make a tremendous impact in the world of Christian education and probably also in public education.

A special word of thanks is due to John Moore and Harold Slusher, the editors, as well as to Tom Barnes, chairman of the textbook committee, to the Zondervan Publishing Company and to all the many writers, reviewers and others who contributed.

I would like to make two practical suggestions to each one of our members. First, it would be an excellent spiritual investment to purchase and give copies of the book to biology teachers and others of comparable influence among young people (C.R.S. members can purchase copies at 20% discount by ordering them from the Creation Science Research Center, 2716 Madison Avenue, San Diego, California, 92116).

Secondly, each one, as a private citizen, can encourage his own state and local school boards to consider the book for adoption either as the basic text or as a supplementary text for the regular biology classes in the school system. We can, quite properly, make the point that it is unconstitutional and discriminatory to indoctrinate young people with the religion of evolution without at least equal emphasis on the much more scientific doctrine of creation, and especially so since an excellent textbook is now available! *Biology: A Search for Order in Complexity*, of course, gives all the standard evidences for evolution, at least as thoroughly as other books do, but then in addition shows their fallacies and gives the evidences for creation, which other textbooks do *not* do.

We also now have another very valuable book available, which ought to be placed in every library as soon as possible. This book is *Why Not Creation?*, published jointly by the Craig Press and the Baker Book House. This volume is a classified anthology of articles from the first five years of the *Creation Research Society Quarterly*, selected by our first president and editor, Walter Lammerts, as articles of the most enduring significance and reference value. It would be a good thing if our members would see that copies of the book are placed in the public, college, and high school libraries of their communities. This book also may be purchased by C.R.S. members at 20% discount.

Incidentally, all royalties from the sale of both books will go back into our textbook and research funds, to help finance creationist research projects and to produce more textbooks.

As many of you are aware, the Society recently has been the object of considerable attention by the secular scientific press, including rather extensive writeups in such unlikely journals as *Nature*, *Bioscience*, *Scientific American*, and others. Numerous stories have appeared in newspapers across the country, including a widely-syndicated and highly critical column by a science reporter who was much more interested in sensationalism than facts. All of these have resulted in new members for the Society, a consequence not intended or anticipated by those who published them!

It is likely that additional publicity will be generated as our books are increasingly brought to the attention of educators and scientists. This will no doubt also stir up some opposition, the nature and extent of which only time will tell. But "the weapons of our warfare are not carnal, but mighty through God to the pulling down of strongholds" (II Corinthians 10:4). These will be times and opportunities for fervent prayer and bold witness, not for equivocation and retreat.

In the meantime, the strength of our creationist

system is constantly growing. Each issue of the *Quarterly* adds important new data and this one is among the best.

Valuable new geologic data are reported, especially in the papers by Walter Peters and Stuart Nevins, which add significantly to the case for Biblical catastrophism in the interpretation of the fossil record. Randall Hedtke's suggestions as to causes for fossil distribution in the geologic column merit serious consideration in evaluating the phenomena during and following the Flood.

The paper on fossil human tracks by Wilbert Rusch is of special interest to me because of past experience with both popular and scientific reaction to the dinosaur and human footprints supposedly formed in the same Cretaceous limestones and now exposed in the Paluxy River bed in Texas. Photographs of some of these appeared on pages 174-175 of *The Genesis Flood*, first published in 1961, and I can testify that these photos generated more interest on the part of more people than any other single item in the book.

As far as popular knowledge of the subject goes, dinosaurs are more identified in the layman's thinking with evolution and the geologic ages than any other aspect of the subject. Thus, evidence that men and dinosaurs lived contemporaneously (as the Bible assuredly teaches) immediately has a most positive and salutary effect on such people, giving them a confidence in the Biblical record which nothing else could do so convincingly.

The reaction of paleontologists to such evidence, however, as well as of committed evolutionists in general, has uniformly been one of impatient incredulity. In their systems men and dinosaurs simply did not live contemporaneously and contrary evidence therefore cannot exist. The "human tracks" must be explained either as (1) carvings, (2) unusual solution or erosion phenomena, or (3) tracks of some unknown animal with human-like feet.

There is no doubt that tracks have on occasion been carved both by early Indians and by enterprising dealers in artifacts. Also there is no doubt that many strange markings, especially in limestone, may be due to natural physical phenomena. Rusch emphasizes, quite rightly, the need for careful consideration of these possibilities before accepting such tracks as genuine.

On the other hand, it is also well to remember two facts: (1) no amount of evidence will ever convince a committed evolutionist that his system is false, since it is his religion and he holds it by faith, not because of evidence; (2) since we are dealing with events of the distant past, not reproducible in the present, and since one cannot prove a universal negative, it is in the nature of the case impossible to show conclu-

(Continued on Page 246)

## THE CYCLICAL BLACK SHALES

WALTER G. PETERS\*

*Black shales of the Pennsylvanian System of west central Illinois were examined in a paleoecological study using micro-radiographic (X-ray) and photographic techniques. Over 80 different fossil varieties were tentatively identified, including a proposed new conodont species, Metalonchodina magnidentatus, Peters, a small Pennsylvanian Onychophore(?), and several freshwater Algae.*

*Study methods included gross and macrophotography, microscopic examination of thin shale chips, and photomicrographic inspection of X-rays of shale samples. The radio-photomicrographic technique supplemented and bypassed the usual practice of crushing and chemically disaggregating the shale to extract the microfossils. Structural details could be observed in fossil elements in X-ray negatives rotated on the stage of the polarizing microscope set at or near crossed nicols.*

*Cyclical deposition was indicated by the structural details of the shale as well as by the virtually mutually exclusive occurrence of foraminifera and conodonts in successively alternating bedding planes and black shale matrix. Rapid transport and burial was implied from the following observations: Orbiculoidea shells packed into lenses up to one inch thick; microlaminations apparently interrupted by small coal balls; and the distorted bedding, both at the bottom and the top of the shale member.*

*All of the reported observations strongly support the Biblical tidal interpretation of fossil deposition and burial.*

### Introduction

Several Pennsylvania black shales were studied and used as the basis of a thesis submitted in partial fulfillment of the requirements for a degree of Master of Science in Education to the Geology Department and Graduate School of Northern Illinois University, DeKalb, Illinois. The research was initiated during the Fall of 1968, and for purposes of the Thesis was completed during the Fall of 1969 and presented in 1970.<sup>1</sup> Since that time, all the X-Ray negatives (radiographs), samples, and notes have been rechecked and updated into a manuscript entitled, "Challenge of Black Shale Radiography."

The most significant result of the study was the establishment of the cyclical nature of black shale sedimentation. Other important observations were the sudden change from land to sea or marine-type fossils; the black-gray shale laminations indicating short-period (time duration) sediment changes; the occurrence of possible fresh-water algae at the bottom and the top of the shale member; the proposed presence of soft-bodied worm-like Onychophores in Pennsylvania rock layers; the two-fold use of the X-Ray negative (Radiograph) technique; and the proposal of a new "species" of conodont (small, still-puzzling toothed fossil elements).

### Material and Methods

The shale studied in detail was hard, compact, sheety (fissile), highly carbonized and very dark gray to black in color. Most of the samples were obtained in Fulton County, in west-central Illinois. This shale (*Member 98* of Wanless)<sup>2</sup> directly overlies a widely mined coal seam, the

Springfield or Harrisburg (No. 5) Coal (see Figure 1). It is thought to be Unit No. 8 of the St. David Cyclothem, correlated with the middle section of the Carbondale Group (Illinois nomenclature) and with the middle-late Desmoinesian Stage of the Middle Pennsylvanian System (Period).

On a nation-wide scale this shale is associated with the following deposits and geological "events": Washingtonville deposits of the Allegheny Group in the Appalachian region; Ouachita mountain fault blocks and volcanic deposits; Uncompaghra Arch deposits from north-east Utah to north-central New Mexico; and deposits of the "uplift" of the Front Range of the Rocky Mountains (formation of some of the Hogbacks facing the Rockies) in central and north-eastern Colorado and southeastern Wyoming, including the uplift of the Laramie Mountains.

Three basic techniques were used: (1) gross and macrophotography of shale at sample sites and of shale samples; (2) examination of shale samples using stereoscopic and regular microscopes; and (3) microscopic examination and photography of images in X-Ray negatives (Radiographs). A fourth technique (X-Ray Diffraction) was used only once to determine the principal component of the distinctly granular gray lenses, that contrasted so sharply with the black shale matrix of the lowermost and top-most layers of our black shale, Member 98. Most of the photomicrographs were taken with a Carl Zeiss Automatic Photomicroscope in the University Geology Laboratory or through a Unitron Polarizing microscope Model MPS with a SLR camera.

With a good Stereo-microscope one can frequently see a three-dimensional panoramic view of the shale matrix and its imbedded microfossils.

\*Walter G. Peters, M.S.Ed. in Geology, is the Earth Science Instructor at Spoon River College, Canton, Illinois 61520.

| NAME                     | MBR                      | LITHOLOGY                                                           |
|--------------------------|--------------------------|---------------------------------------------------------------------|
| CYCLOTHEM<br>↑           | Sheffield Shale 117      | 8 ft. (Lawson Shale): gray, soft, with small ironstone concretions. |
|                          | 116                      | 1½ ft. Shale, yellow-gray, calcareous.                              |
|                          | Brereton Limestone 115   | 2 ft. 6 in. Upper bench more massive.                               |
|                          | 114                      | 2 ft. Shale, dark gray to black, locally fissile.                   |
|                          | 113                      | 1 ft. Clay, sandy, "white top", local.                              |
|                          | Herrin (No. 6) 112       | 4½ ft. Coal, with gray to blue lenses and pyritic concretions.      |
|                          | 111                      | 5 ft. Underclay.                                                    |
|                          | 110                      | 1 ft. Limestone, concretionary.                                     |
|                          | Big Creek Shale 109      | 7 ft. Shale, Gray.                                                  |
|                          | 108                      | 6 in. Limestone, local, marine (?).                                 |
| BRERETON<br>↓            | Cuba (Vermillion) 107    | 40 ft. Sandstone, greenish-gray to light gray, mottled brown, hard. |
|                          |                          | Lower part calcareous.                                              |
|                          | 106                      | 5 ft. Shale, sandy, medium-gray.                                    |
|                          | Canton Shale (upper) 105 | 30 ft. Shale, light greenish-gray.                                  |
| ST. DAVID CYCLOTHEM<br>↑ | (lower) 104              | 6 in. Limestone or band of concretions.                             |
|                          | 103                      | 7 ft. Shale, soft gray.                                             |
|                          | 102                      | 8 in. Shale, calcareous.                                            |
|                          | St. David 101            | 1½ ft. Limestone, massive.                                          |
|                          | 100                      | 1 ft. Shale, dark, calcareous.                                      |
|                          | (No. 5a) 99              | 0-5 ft. Coal, local.                                                |
|                          | **** 98                  | 14-22 in. Shale, black, fissile.                                    |
|                          | Springfield 97           | 4-5 ft. Springfield (Harrisburg) Coal (No. 5)                       |
|                          | 96                       | 2 ft. Underclay, medium to light gray                               |
|                          | 95                       | 2 ft. Limestone, argillaceous, nodular.                             |
| ST. DAVID CYCLOTHEM<br>↓ | 94                       | 2 ft. Shale, calcareous, gray                                       |

Figure 1. Generalized stratigraphic sequence of the St. David and Brerton Cyclothems in western Illinois. F: fossiliferous. Adapted from Wanless (1958, pp. 11, 12) and Kosanke, et. al. (1960, pp. 65, 66).

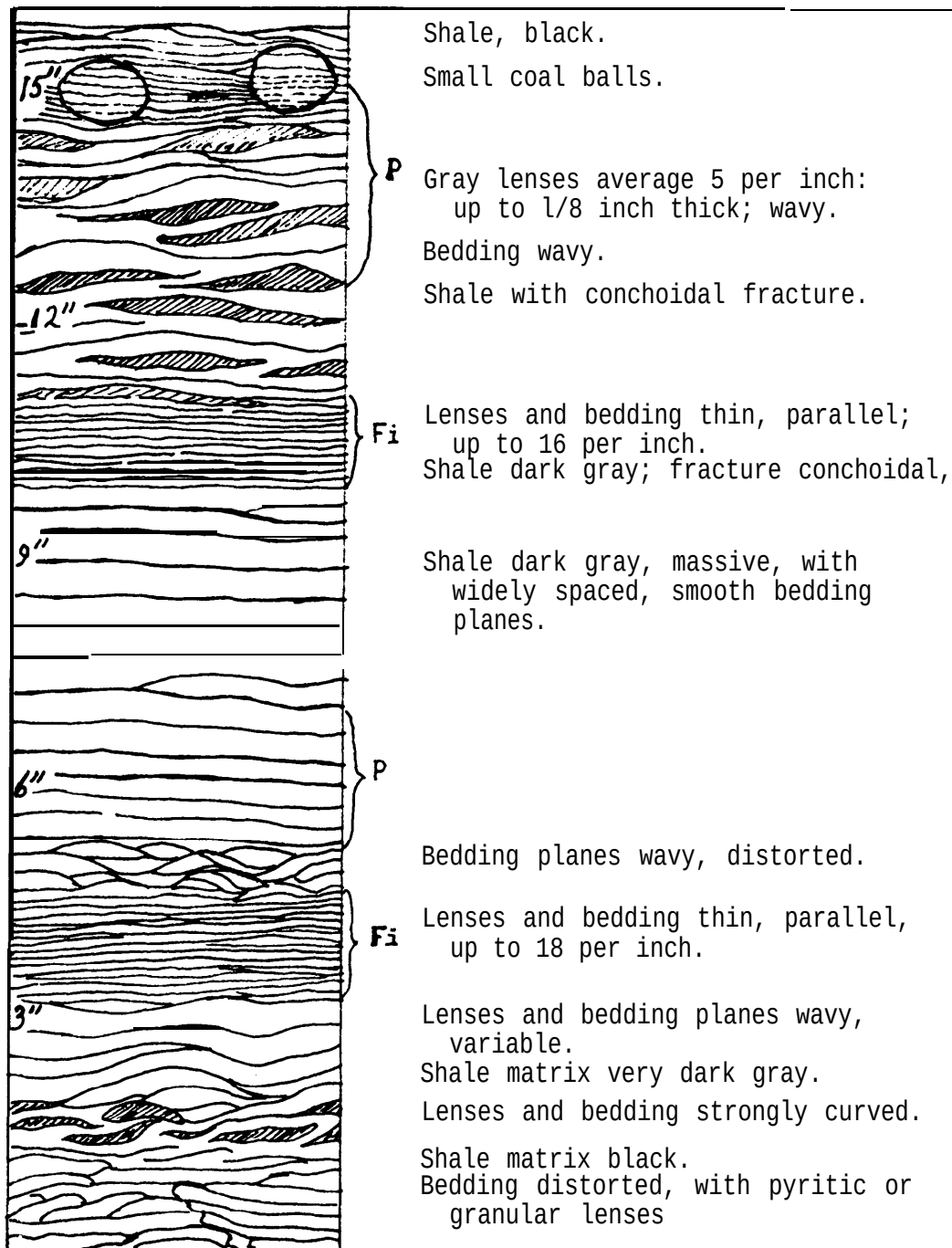


Figure 2. Composite section of the black shale overlying the Springfield (No. 5) Coal, Fulton County, Illinois. P: Platform conodonts; Fi: Very fine lenses and bedding planes.

If the radiograph can be cut and taped to a 3 x 4-inch section of plate glass, it can be rotated on the stage of a polarizing microscope without scratching the X-Ray negative (radiograph). With the polarizing microscope set at or near crossed nicols, the negative can then be rotated from a position of maximum interference (brightest field) toward "extinction" (darkest field). As this is done, cellular and structural details of specimens otherwise overlooked are evident.

Massive pieces of shale about 15 to 16½ inches thick (Figure 2) and having a total area of about eight square feet were obtained *in situ* from open pits of operating coal mines. The total volume of these pieces was about 12 cubic feet. These were then chiseled into thin chips (individual samples) 1/8-inch to 1-inch in thickness. Each chip was numbered and fossil elements were marked-off for more careful identification and tabulation.

### Cyclical Deposition

Black shale, Member 98 of the St. David Cyclothem (Pennsylvanian System), exhibits a cyclical change in shale structure and fossil components. The bedding planes are most strongly distorted, the gray granular lenses are thickest and most prominent, and the black shale matrix is the darkest (blackest) at the lowermost and topmost levels (see Figure 2). The bedding planes are the straightest, the gray granular lenses and microlaminations are the thinnest, and the dark gray shale matrix layers are the thickest in the "massive" central section of the Member.

In two levels of the shale member, the 3-inch and the 10 to 11 inch levels, the lenses and bedding are thin, parallel, and up to 16 to 18 levels per inch. These microlaminations measure about 1/50 of an inch (0.5 mm) in thickness. The persistent alternation of the "black" and "gray" microlaminations strongly suggests alternating sources of sediment laden water.

This is further emphasized by the nearly complete segregation of "protozoan" foraminifera and conodonts into different layers throughout the vertical depth of the shale. Foraminifera are very small shelled protozoans and many species are used as index fossils. The exact affinities of the conodonts is still being debated. They are minute, phosphatic fossils that in general either have "toothed" bars or "blades" attached to a spoon shaped platform. The conodonts were found nearly exclusively in the black shale matrix, while the foraminifera were found nearly exclusively in the gray granular lenses, which were mainly composed of Wilkeite, an intermediate Apatite with the chemical formula  $\text{Ca}_5[(\text{P}, \text{S}, \text{Si}, \text{C})\text{O}_4]_3 \cdot \text{OH}$ .

The time duration of deposition of these alternative layers, especially the microlaminations, must have been short, perhaps only hours or even



Figure 3. *Cladophora*. Sample 200A. 49 X magnification. Radioautograph.

minutes. This conclusion results from consideration of (1) the lack of any evidence of erosion in any of the layers, (2) lack of gradation in degree of compaction, (3) inclusions continuing through several to many layers or laminations (as with coal balls to be discussed later).

Other fossil changes as the shale increases in depth above the coal suggest a rapid change from a land environment to a marine and probably back to a nearly emerged land environment. Put another way, this might reflect a tidal sea advance and retreat. What appear to be freshwater algae (*Cladophora*, *Draparnaldia*, and *Oscillatoria*) (see Figures 3, 4, and 5) and tissue of coal-forming trees are abundant in the lowest inch of the shale. These are mixed with marine(?) *Orbiculoidea* and *Lingula* (inarticulate brachiopod) shells.

One lens of *Orbiculoidea* shells measured nearly 1-inch in thickness, with up to 18 shells exposed per square inch of horizontal surface (sample 105.5/8). This thickness of *Orbiculoidea* shells closely packed into such a lens strongly suggests rapid transport of the shells to the burial spot (allochthonous deposition) (see Figure 6). Rapid burial is also suggested by the fine state of preservation in which the shells are found, most of them still possessing the pearly gray "mother of pearl" aragonite mantle layer.

Marine vertebrate fossil elements were not found below the 1¼-inch level of Member 98. At this level one barbed denticle of a *Listracanthus* (Elasmobranchian) shark was recorded from sample 107.1¼. All other fossil elements of marine Vertebrates (sharks and fishes) were recorded from the 3-inch and higher levels of the shale. These elements included skin denticles, scales and teeth of three different groups of sharks and one group of fishes, the Paleonis-



Figure 5. Possible *Oscillatoria*. Sample 107.1  $\frac{5}{8}$ . (165 X) Radioautograph.

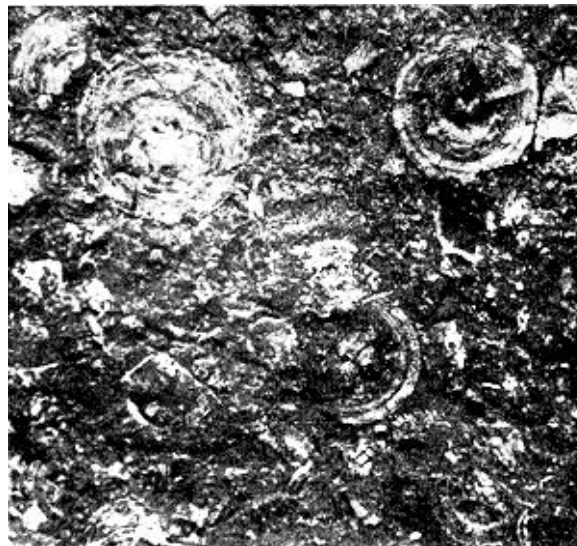


Figure 6. *Orbiculoidea*. (3.6 X) Shells tightly-packed. These number 18 to 22 per square inch of exposed surface.

abruptly in density per square inch of exposed sample surface and in radiographs at the 13 inch level and above. This level also roughly corresponds to the level of thicker gray granular lenses and increasingly distorted and wavy micro laminations and bedding planes. It also coincides with the level in which algal and fungal filaments reoccur. Finally at this level the soft-bodied fossil thought to be an Onychophore was excavated.

The controversial fossil, the Onychophore, a wormlike Arthropod, measures only 4.5 mm long, but seems to bear at least six pairs of retractile appendages. The end of each "appendage" bears six symmetrically positioned hooks or protuberances, which surround a central projection. The *head* appears to be a contraction of several segments, with a centrally located mouth surrounded by two pairs of laterally positioned append-

ages and an anterior appendage. Each of these "head"-appendages appears to be similar in structure to the body or abdominal appendages. Except for its small size, the specimen fits the description of the Pararthropod, *Onychophora* (see Figures 7 and 8).

This writer does not accept the suggestion that the fossil above may be a coprolite. The hypothetical organism, in excreting the "pseudofossil" above would have required of necessity, that its cloaca symmetrically arrange in paired positions digestive residue of nearly identical food-organisms. Secondly, no illustrations of fecal material yet observed by the writer have exhibited internal or external symmetry.



Figure 7. *Onychophora*. Sample 112-13.5. 16 X magnification.

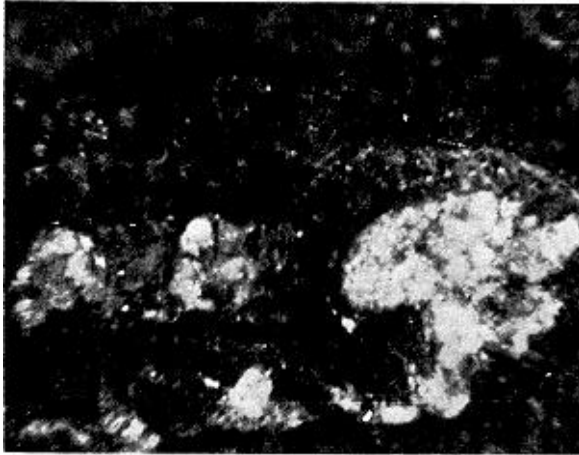


Figure 8. *Onychophora*. 27 X magnification.

A further indication of increased wave action was noted at the 15-inch level. Two small "coal balls" were recorded here (see Figure 9). One of the coal balls became dislodged exposing the inside walls of the cavity it once occupied. The bedding planes lining the cavity were essentially parallel, as they were around the coal ball remaining in the shale matrix. However, *all* bedding planes appeared to be distinctly interrupted by the coal balls. They did not diverge to form lenses around the coal balls as would be expected if the coal balls had originated as concretions.

The angles of the intervening and interrupted bedding planes strongly suggest that the coal balls were transported to their burial site. Their burial would therefore be allochthonous rather than autochthonous, refuting the widely taught concept that they, like the coal, are found where they were formed (or the trees grew). The rate of burial, furthermore, would be rapid rather than slow, probably within a period of minutes rather than of years, since no erosion of the coal balls was observed.

#### Radiographic Identification

Animal and plant fossil elements can at times be effectively identified in X-Ray negatives (radiographs). Several different kinds of conodonts, foraminifera, brachiopods, ostracodes,

algal filaments, (fungal hyphae ?), and tissue of coal-forming trees could be more or less readily identified in the radiographs. The conodont, *Hibbardella milleri*, Rexroad, was exactly identified by rotating it 220° and reexposing the shale sample. The second radiograph clearly showed the small anterior denticle specific for *H. milleri*, Rexroad (see Figure 10). Among other conodonts identified to the species, were *Streptognathodus cf. eccentricus*, Ellison, and *Polygnathus cf. cristata*, Hinde.

An identification which has evoked some interest and controversy is that of the two brachiopods, *Anoplia* and *Girtyella*. The brachiopods are still hidden within the shale matrix of Sangamon County sample 330A. Adjacent to the anterior and lateral edges of the *Girtyella* shell, the radiograph is distinctly darker than it is adjacent to the other brachiopod shells. Close examination reveals the presence of many Endothyroid foraminifera crowded around the brachiopod shell. The writer proposes that they were buried while crowding around the *Girtyella*, rather than settling in this crowded, clustered arrangement as a result of random drifting during deposition. The presence and locations of the Endothyroids are therefore submitted as further evidence of rapid, allochthonous burial (tidal burial).

Perhaps the most interesting plant remains observed in shale samples and radiographs are those of freshwater green and blue-green algae. Filaments apparently displaying distinctly cellular structure resembling *Draparnaldia*, *Cladophora*, and *Oscillatoria* (and possible fungal hyphae) occur in shale samples and radiographs from the lowermost and topmost levels of the Black Shale Member 98 (see Figures 3-5). Their absence in the intervening central massive sec-

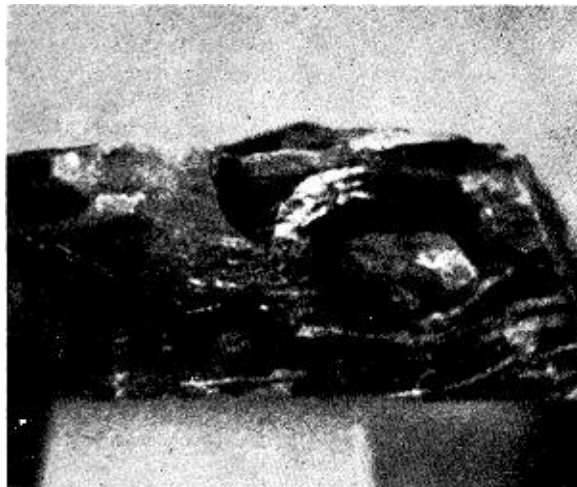


Figure 9. Coal balls in the 15-inch level of Member 98, series 140.



Figure 10. The conodont, *Hibbardella milleri* (Rexroad). Radioautograph. (46 X)

tion of Member 98 suggests a temporary tide-like invasion or intrusion and retreat from the deposition area.

Member 98 was interpreted as a land-ward tidal intrusion of incoming ocean-water mixed with sea-ward moving freshwater causing the distorted bedding planes and microlaminations. As the sea-water level increased in height, it engulfed the deposition site; the tide-like waves becoming deeper and deeper until they deposited the massive central section, and then temporarily retreated from the deposition site causing the reversal of lamination structure. The result being that the laminations and bedding planes at the top of Member 98 were distorted and wavy, as were the bottom layers of the Shale Member. The incoming sea water would engulf the land-freshwater environment causing a mixture of fauna and flora; this mixture is what we apparently observed in the fossil distribution: land-sea mixture at the bottom and at the top of the Member.

#### Radiographic Population Counts

Shale samples from three other Illinois counties were obtained for comparison with samples from Fulton County, mainly for radiographic studies. In several of the radiographs, the numbers of conodont specimens recorded contrasted sharply with the numbers observed visually on the sample surfaces, as follows:

(a) Hamilton County sample 700C revealed



Figure 11. *Metalonchodina magnidentatus*, Peters. Sample 120.7. 62 X magnification.

44 *Hibbardella* specimens in the X-Ray negative and none visually;

(b) Sangamon County sample 300C (the shale overlying the Herrin, No. 6, coal) revealed 60 *Hibbardella* specimens in the radiograph and only 5 visually;

(c) Gallatin County sample 200A revealed an extensive network of algal filaments and minute (radiolarian?) organisms in the X-Ray negative and none exposed at the surface. The algal filament in sample 200A is tentatively identified as that of *Cladophora*, a freshwater green alga (see Figure 3).

#### New Pennsylvanian Forms

Among animal and plant fossil elements perhaps new to the Pennsylvanian System are the Onychophore described above, freshwater green and blue-green algae, an unidentified egg or seed, and a new conodont species, *Metalonchodina magnidentatus*, Peters<sup>3</sup> (see Figure 11). The holotypes of the proposed new conodont species are at present in the Geology Department of Northern Illinois University. The unique feature distinguishing the proposed new species is its large first axial denticle (as opposed to the first distal—rear bar—denticle). This denticle measures 1.2 mm long, 0.1 mm longer than the

main cusp, and gently diverges from the vertical axial plane of growth along an angular curvature equal to but opposite and away from the main cusp. The denticle and cusp curve gently away from each other. In other growth and structural characteristics the new proposed species corresponds to the limiting characteristics of the genus *Metalonchodina*.

### Geological and Philosophical Implications

Geological and philosophical implications that can be drawn from the present study of Pennsylvanian black shales may be somewhat provocative. Among the geological implications the following may merit consideration:

1. Structural and fossil distribution similarities between the bases of Member 98 and the Francis Creek Shale suggest that both were conformably deposited directly over their respectively underlying coal seams.<sup>4</sup> Perhaps there was no "intervening" 6th or 7th rock (lithic) unit in the depositional history of Member 98 of Fulton County (the 8th unit of the "ideal coal cyclothem").

2. Radiography and photo-microradiography can be effectively used in a non-destructive approach to identification of fossils and for microfossil population counts, at least for black, carbonized shales.

3. Many new plant and animal fossil species and genera may be added to the fossil checklists of geological systems, series and stages as the nondestructive X-Ray (radiographic) technique is perfected.

4. Pre-Cambrian, Paleozoic, and more "recent" shales may contain fossil elements that may radically change the interpretation of the environment in which they were deposited. Refinement of the radiographic technique may require a restudy of such shales as the Proterozoic, the Scandanavian Pre-Cambrian, the British Columbian Cambrian Burgess Shale, the Green River Shales, and others.

5. Absence of certain fossils from the checklists of geological systems, stages, formations, or strata does not preclude their existence in some environment of the world (even nearby) during the time the rock layers in question were being deposited. The possible Onychophore, the algae, and *Metalonchodina magnidentatus* are not found in existing available Pennsylvanian checklists.

6. Member 98 exhibited a distinctly cyclical (perhaps tidal) deposition pattern. Many structural and fossil features seem to require a rapid, allochthonous interpretation of its depositional history.

From the geological observations it is obvious that the uniformitarian interpretation of long-

time, slow, undisturbed sedimentation and mineralization cannot hold true for Member 98. Nearly all of the structural and fossil evidence seems to require rapid burial of sediment material transported to the burial site.

These details illustrate the kind of structural details one should expect if the earth had been subjected to a period of intense crustal disturbances and dislocations. They are what one should expect in rock layers laid down during a period of world-wide volcanism, crustal buckling, mid-ocean ridge and rift disturbances, and cloud-burst type rain storms that can accompany crustal catastrophies (Furieux, 1966, 155-165, etc.).<sup>5</sup>

The fossils and structure of the black shale Member 98 in Fulton County, Illinois in many aspects support rather than undermine a Biblical catastrophic interpretation of Paleozoic sedimentation. The writer hopes that more high school graduates and paleontologists will take up the challenge of photomicroradiography, help refine the X-Ray (radiographic) technique, and extend the range of strata (rock layers) of geological systems examined.

It is my belief that, when all formations are studied, it will be found that the entire range of plant and animal families, genera, and species existed simultaneously. The present *apparent* paleontological segregation is attributable to lack of complete identification of all fossils in the various sedimentary rock systems.

It is not proposed that each period such as the Cambrian, Silurian, and Devonian will exhibit all the species of plants and animals, but rather that present boundaries, defined essentially by index fossils, will have to be abandoned when overlap of these fossils from one period into the other is demonstrated. Thus, eventually, vertebrates will be found in the Paleozoic and flowering plant pollen in the Cambrian system.

### Acknowledgment

Without the help of my wife, Dorothy, the study reported could never have been completed within the time allotted for the completion of the thesis.

### References

- <sup>1</sup>Peters, Walter G. 1970. Masters Thesis: A paleoecological study of Pennsylvanian black shales using photographic and radiographic techniques. Geology Department, Northern Illinois University, DeKalb, Illinois. 130 pp.
- <sup>2</sup>Wanless, H. R. 1958. Pennsylvanian faunas of the Beardstown, Glasford, Havana, and Vermont quadrangles. Illinois State Geological Survey, Report of Investigation 305. pp. 9, 11, 12ff.
- <sup>3</sup>Peters, Walter G. *Op. Cit.*, pp. 31,33, and pp. 118-120.
- <sup>4</sup>*Ibid.*, pp. 24.
- <sup>5</sup>Furieux, R. 1966. Krakatao. Prentice Hall, Inc., Englewood Cliffs, N. J. pp. 155-65 ff.

## HUMAN FOOTPRINTS IN ROCKS

WILBERT H. RUSCH, SR.\*

*Mention in scientific circles of so-called human footprints in any rocks results in raised eyebrows and general skepticism that such can be found. Among creationists considerable misplaced enthusiasm is expressed quite often. However, when one attempts a systematic study of the subject of human footprints in rock layers, evidence can be considered in three categories: (1) undisputed human footprints preserved in rocks, (2) documented examples of footprints that have been drawn or carved in rocks, and (3) an open category of unresolved "finds". Evidences for each of these three categories are discussed at length and numerous illustrations of observed materials are provided.*

### Introduction

I suppose Robinson Crusoe's reaction to Friday's footprint in the sand is comparable to the feeling of mystery and conjecture that takes hold of our minds at the sight of footprints from the distant past. A perusal of geological literature indicates an acceptance of footprints of various animals as evidence of their existence contemporaneously with the time of the laying down of the strata in which they are found. So we find frequent references to the three-toed dinosaur prints in the Triassic rocks of the Connecticut Valley. Many geology texts have used the photograph of a child splashing in the twenty-gallon pool of water held by a dinosaur footprint in the Cretaceous limestone of Texas.

However, there is no mention of any human footprints in any rocks. When the subject is mentioned in scientific circles, it causes raised eyebrows, general skepticism that such things can be, or a statement that these items are of no scientific value and hence of no interest. On the other hand, in creationist groups there is often considerable misplaced enthusiasm on the subject, with too great a willingness to jump to unjustified conclusions.

When one "digs" into this subject, one might wonder how much valuable evidence has been discarded or destroyed through ignorance and carelessness. An interesting case comes to my mind.

Some years ago Dr. Frank L. Marsh of Andrews University, Berrien Springs, Michigan, showed me a photograph of an iron pot. The story behind it is as follows:

It would seem that about 1915, a fireman in a power plant in Oklahoma was shoveling native coal into the boiler. Upon reaching an overly large chunk, he had to break it with a sledge, and out of the resulting two pieces fell an iron pot (see Figure 1). He threw the two pieces of coal into the fire, but passed on to others the pot, which ultimately wound up in the private collection of an individual in Missouri. It was photographed at the time, and the picture and the story came into Dr. Marsh's possession some years ago. He personally saw the pot, and exami-

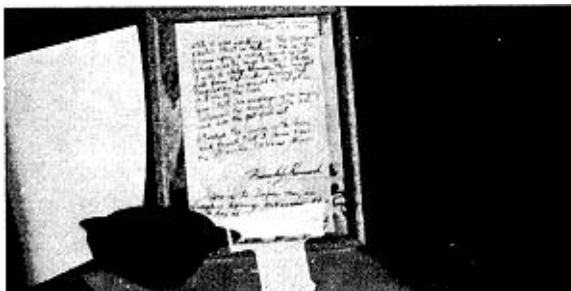


Figure 1. Iron Pot from Lump of Coal. From a letter dated January 18, 1949, Brandon, Minnesota, to Dr. Frank Marsh comes the following excerpt:

During Christmas vacation I visited a friend's museum in southern Missouri. Among his curios, he had the iron cup pictured on the enclosed snapshot. You can probably read the letter in back of the cup.

At any rate, the letter states that this cup fell from a lump of coal and left the imprint in the coal. To me it obviously suggests further evidence of a flood and of a civilization prior to the flood. . . .

Letter signed by Robert Nordling;

In a letter dated February 3, 1966, to Wilbert H. Rusch, Sr., Dr. Marsh made the following statements regarding the pot and the writing on the affidavit:

Enclosed is the letter and snap sent me by Robert Nordling some 17 years ago. When I got interested enough in this "pot" the size of which can be gotten at somewhat by comparing it with the seat of the straight chair it is resting on) a year or two later I learned that this "friend" of Nordling's had died and his little museum was scattered. Nordling knew nothing of the whereabouts of the iron cup. It would challenge the most alert sleuth to see if he could run it down. If the cup could be found it seems to me that coal would still be present in minute quantities in spots. I don't know the geologic age of the Wilburton Mines' coal. If this cup is what it is sworn to be, it is truly a most significant artifact.

As carefully as can be determined the affidavit reads as follows:

Sulphur Springs, Arkansas Nov. 27, 1948

While I was working in the Municipal Electric Plant in Thomas, Okla. in 1912, I came upon a solid chunk of coal which was too large to use. I broke it with a sledge hammer. This iron pot fell from the center, leaving the impression or mould of the pot in the piece of coal.

Jim Stall (an employee of the company) witnessed the breaking of the coal, and saw the pot fall out.

I traced the source of the coal, and found that it came from the Wilburton, Oklahoma, Mines.

Frank J. Kenwood (?)

Sworn to before me, in Sulphur Springs, Arkansas this 27th day of November, 1948.

Julia L (?)

N.P.

\*Wilbert H. Rusch, Sr., is Professor of Biology, Concordia College, Ann Arbor, Michigan 48104.

nation of it indicated nothing that would contradict the story. Since then, the owner died and the pot has been lost.

Assuming that the story is true, and if the fireman had saved the two parts of coal as well as the pot, I wonder what explanation coal geologists would have come up with to explain the presence of a fashioned iron pot in situ in a coal bed! One wonders how many times this same sort of thing has happened in the past several hundred years.

When one attempts a systematic study of the subject of human footprints in rock layers the evidence can be considered in three categories: (1) One finds that there really are undisputed human footprints preserved in rock. (2) There are also documented examples of footprints having been drawn or carved by various human beings in the past. (3) Finally there are examples that would seem to fall into the open, unresolved category.

### **Human Footprints in Rock**

In 1940, Mr. F. B. Richardson of the Carnegie Institution, Washington, D. C., discovered a series of footprints in rock which were made by people fleeing from a volcanic eruption. The footprints were uncovered during a quarrying operation on the outskirts of the city of Managua, Nicaragua. Previously, Dr. Earl Flint of the Peabody Museum had found similar footprints and collected several samples. However, since most archaeologists were firm believers in the recency of man in the Americas, the evidence was set aside and no further investigations were made at that time.

The rock setting in Nicaragua is as follows. Over a deposit of volcanic ash, there is a deposit of volcanic mud that is about six inches deep. The footprints seem to have been made by two people walking on fairly firm material. Other people walking to their right were in material so soft that their feet sank into it. There also are footprints of a deer crossing this area. The assumption is that the footprints were made shortly after the volcanic mud had covered the area.

Dr. Howel Williams of the University of California examined the prints and considered the circumstances to be such that there can be no question of the authenticity of the footprints (see Figure 2). They are not carvings, but are definitely the impressions of human feet. The individuals are considered to be fairly small people with apparently no children, since all the prints are about the same size. Quarry workers reported that additional footprints, destroyed as a result of the quarrying operations, all pointed in the same direction as those observed.

The beds underlying the footprints are made up of hundreds of feet of ash. The geological

setting suggests that neighboring volcanic craters erupted, causing mud flows which are considered to be remarkably like those that buried Herculaneum, Italy. Shortly after the footprints were made, a thin layer of black cinders covered them (see Figure 3). This was followed by another mudflow followed by more cinders interspersed with large numbers of mud flows. In a quiet interval, a river cut a channel into the underlying ash. This was followed by another eruption and pumice covered the area to a depth of more than a foot. In the succeeding quiet period, rivers cut new channels. Then top soil to a depth of three feet developed. Renewed eruptions covered this soil with ash. In the next quiet interval, ten inches of soil developed. Apparently, four layers of soil, including the present top soil, have been developed in addition to the river channels that have been cut.<sup>1</sup>

Thus, there is undisputed evidence of human fossil footprints being preserved in, of all things, igneous rock. So the possibility of human footprints in rock strata has to be taken seriously.

### **Natural "Footprint" in Rock**

On the other side of the coin, it must be recognized that natural formations can be quite strange in appearance. I had the opportunity to observe this directly on April 29, 1970, during a physical geology field trip to observe evidence indicating glaciation near Ann Arbor, Michigan, when a small sandstone boulder was found on the discard pile of a gravel pit in the interlobate region known as the Waterloo Recreation Area. It was probably derived from the Marshall sandstone which outcrops to the north and west of Ann Arbor.

The boulder was apparently a concretion which had weathered out and had then been ice and/or water transported to the site. As frequently happens to such sandstone boulders and cobbles, weathering had caused it to separate as if run through a bread slicer. To the astonishment of all present, one of the slices showed a gray sandstone "footprint" roughly "human" in outline against the red sandstone margin (see Figure 4). (Note: The lighting angle resulted in shadows that overemphasized the elevation differences. Careful trimming could be done to eliminate the step differences.)

As can be seen from the picture of another slice (see Figure 5), this is a three dimensional core of gray sandstone within the maroon sandstone outer surface (see Figure 6). The gray core changes shape at different surfaces on different slices. But one slice shows an astonishing resemblance to the outline of a human sandal print. In fact the average person who sees it calls it a human footprint. The possibility of such a "sport of nature" must therefore be borne in mind

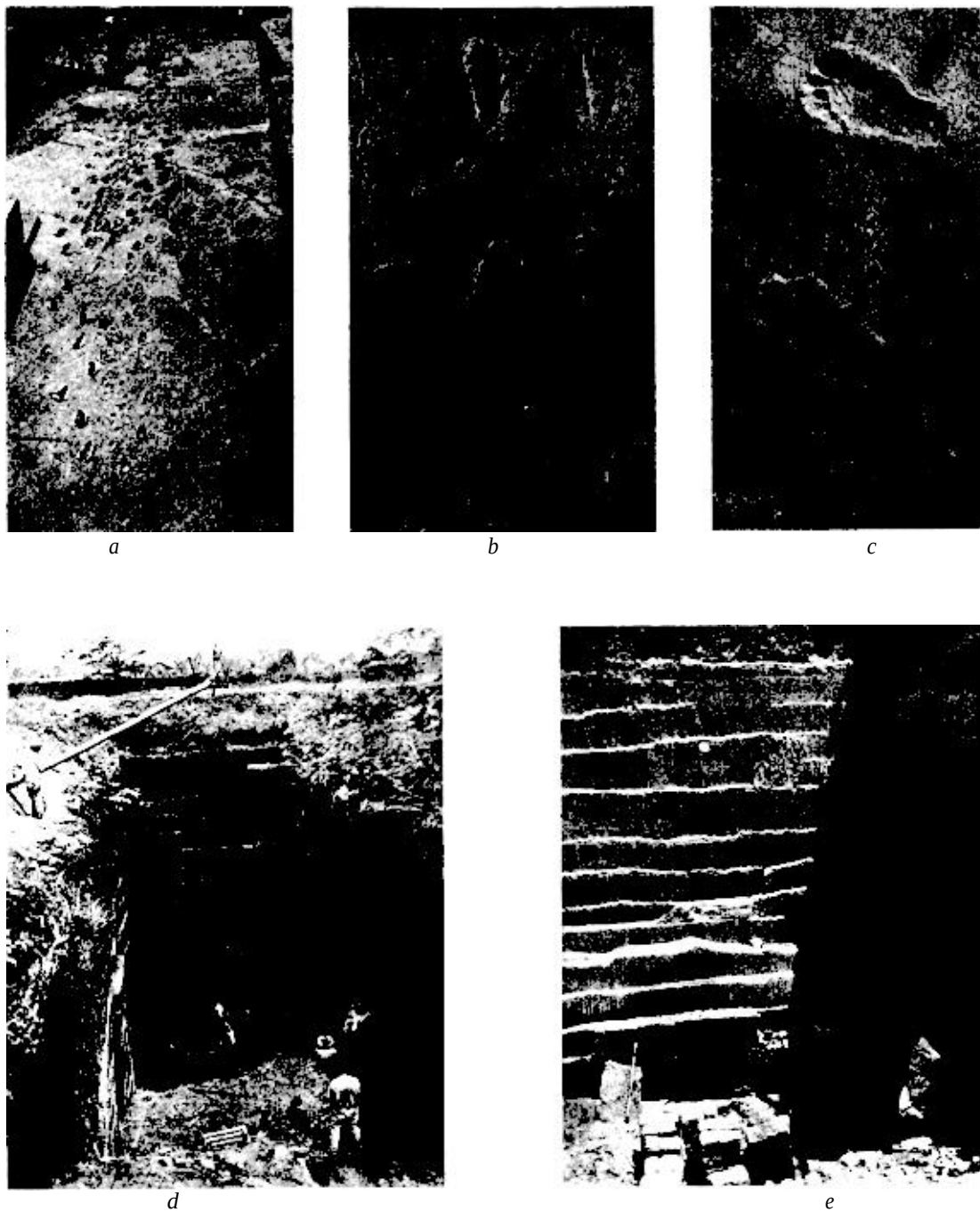


Figure 2. Footprints of people fleeing volcanic eruption. Photographs of footprints and quarrying operation, Managua, Nicaragua.

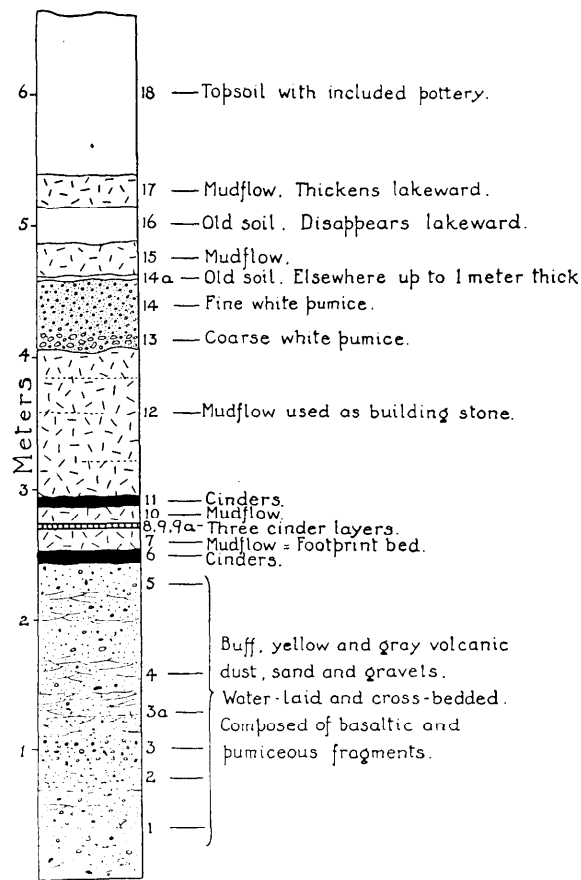


Figure 3. Principal geologic section of area near Managua, Nicaragua. Section shows pumice and ash deposits lying several meters thick above the footprint bed.



Figure 5. "Footprint" in a sandstone boulder. This view of the 'footprint' shows that the elevation differences (see Figure 4) are not great.



Figure 4. Natural "footprint" in sandstone boulder, found near Ann Arbor, Michigan. Despite the apparent "human" shape, this "print" was formed otherwise inside a sandstone boulder.



Figure 6. "Footprint" in sandstone boulder. A gray sandstone core is surrounded by maroon sandstone. Note the astonishing resemblance to a human footprint in a naturally formed rock substance.

when considering the problem of human footprints in rock.

### Footprint Reports in Literature

Research into old volumes of *American Journal of Science* yields a surprising number of references to footprints in rock. The following is a survey of my library research for reputable references to footprints in rock.

In 1817, at Herculaneum, Missouri, two tracks were found in a quarry, which were taken up and placed in the back wall of a chimney. There was also a report of tracks having existed upon rocks between Esopers Landing and Kingston, N. Y., on the banks of the Hudson. No information is available as to the present whereabouts of these specimens.

The first detailed record of human imprints in the United States is found in *The American Journal of Science* for 1822.<sup>2</sup> Henry Schoolcraft noted the presence of some human footprints in a limestone slab located in a paved area between a house and garden in New Harmony, Posey County, Indiana. At the request of the Rev. Frederick Rappe, the rock bearing these prints had been transported from limestone layers on the west bank of the Mississippi River at St. Louis, Missouri. Apparently there were large numbers of these prints at the waterfront which already had been noted by the French when they first arrived at the site of St. Louis.

The footprints were found in a crinoidal limestone. The prints were those of a man standing erect in a natural position. The toes were spread as if not used to the confinement of shoes. The feet were spread so that heel to heel measurements were 6¼ inches while the toe to toe spread was 13½ inches.

Schoolcraft described the prints as "strikingly natural, exhibiting every muscular impression, and the swell of heel and toes, with a precision and faithfulness to nature which I have not been able to copy." The foot length was 10½ inches; the width across the spread toes, 4 inches; and across the heel, 2½ inches. Schoolcraft also reported a faint outline of a sort of scroll, 2½ feet in length, placed ahead of the prints as if a man were idly doodling with a smooth stick while standing. The dimensional figures given were taken by Schoolcraft on July 19, 1821.

Schoolcraft corresponded with Col. Thomas Benton on this subject. Benton considered the tracks that were moved to Indiana to be carvings for the following reasons:

1. the hardness of the limestone;
2. there were no other prints visible leading to and from the two prints on the block (this is difficult to ascertain owing to a lack of any positive information as to where the tracks had originally been located); and,

3. the difficulty of supposing a change so instantaneous and apropos, as must have taken place in the formation of the rock, if the prints were impressed when soft enough to receive such deep and distinct tracks.

Interestingly enough, other footprints carved by Indians were known to Schoolcraft, and he refers to the grotesqueness of these in contrast to the striking naturalness of the prints under discussion.

The source of the prints was a rock that was uncovered for a distance of three miles in front of St. Louis during low water stages, and the outcrop varied from one to 200 feet in width. The prints "looked" as old as the rock, that is they showed the same fine polish which the action of sand and water produced on the rest of the rock. Schoolcraft considered them to be exquisitely natural.

In *The American Encyclopedia*,<sup>3</sup> reference is made to a mountain about two miles south of Brasstown, which is famed for the curiosities in its rocks. There are on several rocks a number of impressions resembling the tracks of turkeys, bears, horses and human beings, as visible and perfect as if they were made on snow or sand.

Sir Woodbine Parrish, the discoverer of *Megatherium*, told a correspondent (identifiable as the first systematic researcher in ripple marks in sandstone and referred to in Jameson's *Edinburg Journal*, issue unknown) that human impressions had been seen in various locations in South America. The Catholic laity there believed them to be the feet of the Apostles.<sup>4</sup>

### Evidences of Stone Carvings

A Prof. W. A. Adams noted in a letter to the *American Journal of Science*<sup>5</sup> that he was surprised to see in a previous issue that so many respectable authorities could be found who would support the idea of genuine human footprints in rocks. He seemed to feel differently due to encountering some carved prints in a canal embankment that were uncovered when the Muskingum River broke out of its banks and removed the overburden. But these prints were an entirely different matter from Schoolcraft's. Adams described them as two human footprints, natural size, accurately drawn, outlined as if by pointed chisel and mallet, with an intaglio effect worked in. They were accompanied by many gigantic turkey tracks whose form seemed to have been made by a series of dots. Unfortunately the rock was quarried and broken up.

The difficulty is that these tracks do not seem to be available for study today. As seems to be the case in so many instances, no attempt has been made to preserve such items. There is even a reluctance to objectively discuss them, to exam-



Figure 7. Footprints in Washington State Park, St. Louis, Mo.

ine them for genuineness. Rather, the usual reaction is to avoid discussion. Attempts at preservation are found only in cases where recent carving seems certain as their source.

An exception, up to at least 1961, was a block of limestone in the basement of the geology building of Washington University in St. Louis, Missouri. When I photographed this block, it had the following legend attached:

#### INDIAN TRAIL-END MARKER

Footprints carved in rock to mark trail end at springs and river crossings. Common in Missouri and the Southwest. Probably from Ste. Genevieve County, Mo. Formerly in the garden of Firmin Desloge at Potosi, Mo., up to his death in 1856. Loaned by his daughter Clara Desloge Pike to Washington University.

The accompanying photograph (Figure 7) shows the prints with a ruler to show size. The prints could have been carved, but there was a total lack of chisel marks. There was an elliptical depression just forward of the heel in each print. D. K. Greger, deceased, of the Washington University department of geology and a serious student of Indian cultures, reportedly said that the Indians had the custom of placing carved footprints at the end of a trail or at the site of a portage.

There is no denying the fact that there were Indians in the past who drew and carved various signs, including human footprints. One clear example that I had opportunity to observe first hand is located in Washington State Park, south



Figure 8. Footprints at Washington State Park, St. Louis, Mo. The footprints and other carvings are outlined in white.

of St. Louis, Missouri (see Figures 8-9). These carvings are outlined in white and protected from the wear of people walking on them. The sign at the beginning of the trail leading to the prints proclaim; them as petroglyphs, and it is assumed that Indians used them as trail markers. This is probably so, since the carvings include such well-known Indian signs as thunderbird, reverse swastika, etc. The human footprints are four-toed and resemble the drawings in a comic strip, some even like those of a child (see Figure 10).

Inscription Rock is on Kelley's Island in Lake Erie off Marblehead Peninsula, Ohio, about a mile east from the ferry landing. Faintly visible on this large limestone boulder are the carvings of Indians, very similar to those at St. Louis. Erosional agents, and possibly vandalism, have all but obliterated them. By reading a marker, one can still identify and locate these carvings. at least faint outlines can still be seen. In recent years a shelter has been erected over the rock.

Another possible example of Indian carving may be found on a glacial granite boulder on the University of Nebraska campus just north of 11th and R Streets in Lincoln, Nebraska. It weighs approximately four tons and was found in Cedar County, Nebraska, between Hartington and Coleridge, Nebraska. This boulder is covered with writing that resembles ancient Hebrew. Runic and Mexican symbols, but the most outstanding item is a human footprint.

The boulder was discovered in its original location by Prof. Samuel Aughe of the Nebraska State Department of Geology in 1869. In the



**Figure 9.** Footprints at Washington State Park, St. Louis, Mo. are apparently carvings as they are found with petroglyphs.



**Figure 10.** Four-toed footprint at Washington State Park, St. Louis, Mo. is probably carving. This four-toed foot resembles the drawings in a comic strip.

following 23 years various scholars examined the boulder, endeavoring to solve the mystery of the carvings. It was agreed that they were not accidental, nor were the carvings made where the boulder was found. There is no evidence to link the writing on the rock in any way with Nebraska Indians.

The boulder was brought to the campus by members of the University of Nebraska class of 1892. For a period of about 60 years the writings were forgotten by all concerned and the boulder lay on the campus with the inscriptions unnoticed. Then in the fall of 1961 they were "re-discovered," the carvings emphasized by whitening, and the boulder was then photographed for newspaper publicity (see Figure 11). Certainly this example, by the nature of the rock itself, must be classed with the Washington State Park exhibit as known carvings. Thus, it would seem that we have unquestioned examples of footprints that have been carved by early residents of America. Figure 12 shows this carving with a shoe nearby.

#### **Some Prints: Actual or Carvings?**

However, there are some examples that cannot be so simply categorized. In my opinion they cannot definitely be considered actual footprints. On the other hand, they cannot simply be dismissed as carvings. In this category would belong those located in the Pottsville sandstone outcropping at a point southeast of Berea, Kentucky.

The known history of this outcrop is rather complex. Therefore as part of an attempt to

form as complete a record of these footprints as possible, the writer planned to devote two weeks to this project. Plans called for checking the area exposures of the formation containing the prints, the Pottsville sandstone, as well as attempting to pick up leads from area inhabitants, if and where possible.

A preliminary survey was made in a few days during the month of July, 1963. The site of the footprints was located and a preliminary examination was made; however, time was short and a resolve was made to spend a longer time at the site. A second trip began from Ann Arbor, Michigan, on June 20, 1964. Needed "quad" maps were picked up at the State Geological Survey, Mineral Industries Building, University of Kentucky campus, Lexington, Kentucky.

Previously, a number of inquiries had been sent to neighboring state geological offices, e.g., Kentucky, West Virginia, Pennsylvania. In the case of Kentucky, no reply was received, although a self-addressed postpaid envelope had been enclosed. Inquiries at the office in person elicited professed ignorance of any kind of footprints whatsoever, except in the case of one individual who eventually admitted that he had heard a rumor of some person who claimed to have found some prints. The consensus seemed to be that there were no such items anywhere in Kentucky, even carved ones.

A base for first operations was selected within easy radius of Rockcastle, Laurel, and adjacent counties in Kentucky. After a week of fruitless checking, decision was reached to revisit the

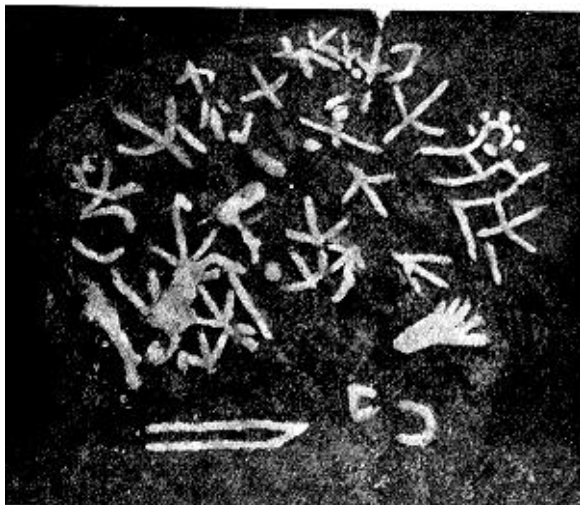


**Figure 11. Newspaper photograph of Indian carvings found on granite boulder, University of Nebraska campus. The footprint is present with mysterious symbols and is obviously carved. Lincoln Evening Journal and Nebraska State Journal, November 6, 1961, page 8.**

original print site. Contact was made with Mr. William Finnell, a local furniture dealer in Berea, whose father, Ott Finnell, originally owned the farm where the prints were found. Sessions with Mr. Finnell proved very interesting and enlightening.

Mr. Ott Finnell had acquired several hundred acres in the area southwest of Berea. Although now wooded, in the late 1800's it was all under cultivation. For a good many years there was a rock known as "Bear Paws Rock" about the level of the present road which ascends to the outcrop. This had some prints on it which gave the rock its name, and no further information on this rock is available other than its destruction in 1923 by blasting operations when the aforementioned road was constructed.

About 1930, logs were cut at the top of the hill, and "snaked" over the edge to the road below. This operation uncovered the overburden from the sandstone at the top near the edge, and another set of prints was exposed. Mr. Finnell remembered well the prints for the whole of their existence. Originally he says there were 16 tracks of footprints, many arranged in a normal walking stride. He checked out a number against his own stride.

Shortly after that time, Dr. W. G. Burroughs, who was then State Geologist for Kentucky as well as geology professor at local Berea College, became interested and made extensive studies of the prints. Mrs. Burroughs is also a qualified geologist, and they studied these items together. At the time, considerable publicity was given to



**Figure 12. Footprint on rock, University of Nebraska campus. This is an example of a known carving. Shoe added for comparison.**

the find, with the result that there were many visitors to the site. Further, a natural increase in weathering due to exposure plus a good deal of vandalism has resulted in most of the tracks becoming faint and indistinct.<sup>6</sup>

Attempts at preserving the tracks were complicated by a peculiar legal situation which developed. Mr. Ott Finnell believed he owned the area as part of his extensive holdings. But when the publicity broke, a Mr. Barlow Clark came forward and claimed that he had been sold that acre. A recording in the courthouse gave a semblance of truth to his claim. Mr. Ott Finnell didn't feel that the one acre was worth litigation in those days, and so ignored the whole matter. Since that time, Mr. Clark died intestate, leaving about 70 heirs to that one acre. Mr. William Finnell has tried to buy the acre to complete his holdings, but clear title cannot be procured, since all the heirs cannot be located. So this has become a case of a permanently clouded title.

The question of the title played into the matter of trying to preserve the prints. The fact that there is no established ownership makes difficult any attempt at protection. Photographs taken at the present time show the degree of destruction. One print was completely broken off when the edge of the sandstone was broken, since it was at the edge of the outcrop.

A return to the site with Mr. Finnell, carrying a five gallon bucket of water to the site over rough areas, was worth the trouble. Spilling the water over the exposure, brought out items not seen before and clarified those that had been previously seen. A new set of photographs was taken of the prints and of the site in color and black and white.

To preserve tangible evidence of all prints remaining, plaster and water, as well as simple tools, were transported to the site. A successful procedure was found for making casts of all



**Figure 13.** Footprints in Pottsville sandstone adjacent to Ott Finnell property near Berea, Kentucky. Shoe added for comparison. Over-all view shows several prints. Water was spilled over the outcrop to produce clarity of detail.



**Figure 15.** Footprint in Pottsville sandstone adjacent to Ott Finnell property near Berea, Kentucky. Human foot added for comparison.

prints that remained in sufficient contrast. The prints were coated with detergent, plaster was dusted in, and then they were poured. These are now available.

Figures 13-18 show the footprints as photographed in 1964. Contrast in the photographs of the prints is poor because of the effects of weathering which has blurred the outlines of the prints. Evidence of vandalism is seen in the attempt to carve one footprint out (see Figure 16). For the purpose of establishing the sizes, either the author's foot or shoe are shown alongside the prints. Also for the sake of comparisons, I photographed my wet footprint on the outcrop as well as my footprint in beach sand (see Figures 17 and 18).

#### **Research Report of Kentucky Prints**

Correspondence with Dr. Burroughs revealed that he had carried out a unique investigation.



**Figure 14.** Footprint in Pottsville sandstone adjacent to Ott Finnell property near Berea, Kentucky



**Figure 16.** Footprint in Pottsville sandstone on Ott Finnell property near Berea, Kentucky. Evidence of vandalism is seen as someone attempted to remove this footprint.

He fitted a low power microscope with an aperture which would limit the field to a relatively small area, so that a count could be made of the grains of sand in a given area on the surface of the rock. This microscope was then set up at the footprint site. This procedure revealed a consistently greater number of grains in the soles of the prints than in the adjacent rock, which would seem to indicate that there had been compression, as for instance from the weight of an individual standing in place.

Dr. Burroughs considered these to be actual prints, based on his sandgrain comparison technique. Two physicians of Berea, Drs. Baker and Cornelius, also studied the grains and reported, "the sand grains in the bottoms of the prints were much more closely packed than those in the slopes, and those in the slopes were more closely packed than those in the rocks an inch from the margins of the prints, or at any other point."<sup>7</sup> Dr. Burroughs referred to the prints in one article as

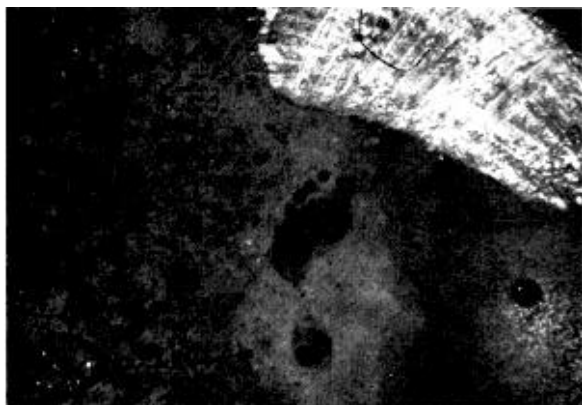


**Figure 17. Photograph of author's wet footprint on rock outcrop for comparison.**

being formed by *Phenanthropus mirabilis*,<sup>8</sup> organism unknown.

An original report<sup>9</sup> gave the following information: The Kentucky tracks are definitely not the tracks of amphibians. They were made by creatures that walked on their two hind legs and had feet strikingly like human beings who had never worn shoes. The kind of creatures that made the tracks has not been determined. Mr. Charles Gilmore of the Smithsonian Institution entered into correspondence with Dr. Burroughs on the matter. Strangely enough, Mr. Gilmore never really questioned the authenticity of the prints, but neither did he ever go to the site to observe the prints for himself, nor did he ever report them in a Smithsonian Bulletin. Dr. Burroughs reported<sup>8</sup> on the find directly as follows,

The footprints are sunken into the horizontal surfaces of an outcrop of hard, massive gray sandstone on the O. Finnell farm. There are three pairs of tracks showing left and right footprints. The remaining distinct impressions are single tracks, the other foot in each case not having made an impression in the sand, or if an impression was made it was washed away or has been eroded since the sand became rock. In addition to the complete footprints, parts of footprints were found. The tracks extend in various directions and bear no relation to each other, except for the left and right impressions of a pair of tracks. Each footprint has five toes and a distinct arch. The toes spread apart like those of a human being who has never worn shoes. The length of the foot from the heel to the end of the longest toe is nine and one-half inches though this length varies slightly in different tracks. The width across the ball of the foot is 4.1 inches while the width including the spread of the toes is about six inches. The foot curves back like a human foot to a human appearing heel.



**Figure 18. Photograph of author's footprint in beach sand for comparison.**

The sand grains within the tracks are closer together than the sand grains of the rock just outside the tracks due to the pressure of the creatures' feet. Even the sand grains in the arch of one of the best preserved tracks are not as close together as in the heel of the same track, though closer together than the sand outside the track. This is because there was more pressure upon the heel than beneath the arch of the foot. In comparing the texture of the sandstone only the same kind of grains and combination of grains within and outside of the tracks are considered. The sandstone adjacent to many of the tracks is uprolled due to the damp, loose sand having been pushed up around the foot as the foot sank into the sand. The forward part of one track is covered by solid Pottsville sandstone only a few days or weeks younger than the sandstone in which is the track. Another track nearby is also partially covered by solid Pottsville sandstone of the Coal Age. One pair of tracks shows the left foot advanced relative to the right foot. The distance from the end of the heel of the right foot to the end of

the heel of the left foot is eighteen inches. This indicates somewhat the length of legs and height of the creature that made these tracks. There are no indications of front feet although the rock is large enough to have recorded front feet if front feet had been used to move about. In the pair of footprints that show the left and right feet about parallel to each other, the distance between the feet is the same as that of a normal human being. Nowhere on this rock nor on another rock outcrop that also has numerous similar tracks upon its surface, is there any sign that these creatures had tails.

The *Science Newsletter* followed the original report by an article under the title, "Geology and Ethnology Disagree." In part the account<sup>10</sup> reads:

So confident is Professor Burroughs that the tracks are real footprints that he has given the unknown animals a scientific name, *Phenanthropus mirabilis*. The name was suggested by Dr. Frank Thone, editor in biology of Science Service, with the concurrence of Mr. Gilmore. The first part of it translates as "looks human," and the second word simply means "remarkable."

Dissent is registered by David I. Bushnell, Jr., Smithsonian Institution ethnologist. Mr. Bushnell said, in a statement issued to the press, that every print he examined was undoubtedly an Indian carving. A prehistoric tribe or tribes, he believes, attached to them some symbolic meaning.

It is quite possible that the disagreement is more apparent than real. Unquestionably, many, perhaps most, of the footprint-like marks in the rocks over a wide stretch of country were carved by human sculptors. Their artificial nature is manifest at a glance, especially when they are found paired, arranged in even rows, and accompanied by other symbols such as circles and three-pronged figures like great bird tracks.

It is quite as possible that other tracks are genuine footprints, especially when they are arranged quite at random, as the Berea tracks are, and where the prints vary greatly in size, as some of them do. It is this circumstance, in part, that has convinced Professor Burroughs that the Berea markings are not artificial.

Dr. Alson Baker, a physician of Berea, recently wrote Science Service that he and Dr. A. F. Cornelius had made a critical examination of the tracks there, using a strong magnifier mounted on a tripod. He states:

We examined the arrangement of the sand grains in the deepest portions of the prints,

with especial attention to the heels. The sand grains in the bottoms of the prints were much more closely packed than those in the slopes, and those in the slopes were more closely packed than those in the rocks an inch from the margins of the prints, or at any other point.

Each member of the party certified and checked these findings and we all agree that the imprints were made by pressure when the sand was soft and wet.

The fact that the sand grains in the bottoms and slopes of the imprints are of exactly the same kind as those in all other parts of the rock surface examined, seems to prove conclusively that the closer arrangement observed was not due to any possible drifting in of extraneous material.

Certainly these prints should not be ignored or hidden, but should be objectively studied and reported. A creationist has the obligation to consider them as rigorously as he expects an evolutionary paleontologist to consider his fossil finds, not making them say anything further than the facts indicate. Extreme care must be taken in positively identifying the maker of a print.

At the present time I am undecided as to whether the prints are carvings or made by organisms walking. The following points would seem to favor the carving theory:

1. the great variability of the prints, namely three distinct forms.
2. the absence at present of any consistent stride pattern. This may have existed at an earlier date, before some of the prints were completely weathered away.
3. the similarity between Figure 14 and some of the Washington State Park prints from the St. Louis area.

On the other hand, the sand grain analysis would seem to support the idea that the prints were made by organisms standing or walking. In any case, it would be a mistake to make absolute statements as to the humanity of the makers of the tracks. Certainly the presence of the overburden (6 to 10 in.) on top of the prints does suggest a considerable time passage between production of the prints and their discovery. Before making a definite statement on the authenticity of the footprints, I feel the need for further study, particularly with respect to the sand grain count.

Checking all Pottsville sandstone outcrops is a monumental task, far beyond the work of a little better than a week. Several years would be needed for an exhaustive search. Dr. Burroughs said there were no other prints that he regarded as authentic anywhere in the state of Kentucky. This raises doubt as to the value of such a search.

Mr. Finnell had heard of some in the next county towards Livingston, Kentucky. Search was made for these. After a number of misdirections and wrong information, a rock was located nine miles beyond Three Links, Kentucky. This was a rock on a slope, with the surface at an angle of about 45°. On this rock are the prints of a bear(?) along with some other marks. This rock was in the center of a logging operation carried on by the land owner, Mr. Joe Daugherty. Nothing was known by anyone of the history of the rock or its markings.

I suspect that the rock has slid down from its original location further up the slope. It is sandstone, presumably Pottsville. Photos of the rock are now on file. The clearing was being done with mule and human labor, and although the owner was polite, there was an understandable impatience with the interruption of his work. It might be worthwhile to make a return trip and get plaster casts, as well as use Dr. Burroughs' technique for determining whether the mark is carved or actually an imprint in unconsolidated sediments.

It is difficult to get information from the natives of the area in an endeavor to track down some possible clues. The present generation seems to know nothing of these or any other prints, and cares less. Tracing and checking are also made difficult because ownership of the land has changed a number of times, and no one remembers readily who now owns a given farm or plot of land. Another complicating factor is that in many cases what was farm land fifty years ago, has now reverted to forest to an almost unbelievable extent. All of this adds to the difficulty and magnitude of the task. Much of the area is being taken over by the government as part of the Cumberland National Forest.

A "lead" to the Pineville Mountain and Cumberland Gap area proved a false alarm. But in the latter area it was ascertained that a footprint had been found in Mammoth Cave (see Figure 19). A few days were spent in that area. It was hoped that additional information could be gleaned as to the survival of footprints over long periods of time. Due to tremendous number of visitors, the author could not be taken to the site of the footprint in Mammoth Cave. However, through the courtesy of Chief Naturalist George Olin, files of prints were made available and permission was given to make copies of the prints; and, copies were made of prints of the Indian, Lost John, who was believed to have been contemporaneous with the makers.

A footprint can be clearly seen in the hardened mud of the cave floor as can be noted from the accompanying photo (see Figure 19). The maker of the print, and Lost John as well, penetrated great distances into the cave looking for gypsum.

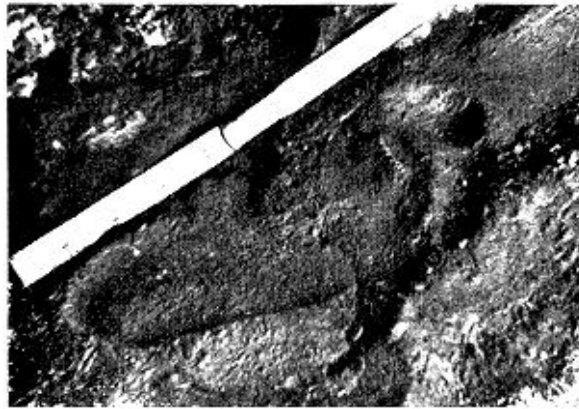


**Figure 19. Footprint in hardened mud floor, Mammoth Cave, Kentucky. The remains of "Lost John" (an individual believed to be contemporaneous with the maker of this print) were dated at 2470 B.C. by C-14 analysis.**

But no one knows why they were looking for it, or what they did with the gypsum when they found it. Lost John apparently lost his life when a block of the wall came down on him while he was underneath chipping gypsum. Lost John is only on display in the depth of the cave. Lost John has been dated by C-14 methods at 2470 B.C.

Mr. Olin also introduced me to Dr. Watson of the Cave Research Foundation. Representatives of this group were at work in the cave system under Flint Ridge in the Park adjoining Mammoth. The Cave Research Foundation had also found footprints both in dust as well as in mud, both barefoot as well as shod. These were located some 2½ to 3 miles into the cave. These prints were about as far into the cave as is the print in Mammoth Cave. Dr. Watson offered to take me down to the prints, but he also indicated that it would be dangerous and strenuous, so I politely declined, since for my purposes there was nothing to be gained by direct observation.

### Postscript

As a postscript I would draw the attention of interested readers to the October-November, 1970 issue of *National Wildlife*. The pertinent article<sup>11</sup> is entitled "On the Trail of Bigfoot." In October 1967, Roger Patterson had encountered a large bipedal creature walking through the woods near Buff Creek, in the wilderness of northern California. His horse threw him as he was taking pictures but he did manage to shoot a few 8 mm frames of the creature. These few feet of film showed the outline of a large hairy anthropoid, about seven feet tall and weighing about 400 pounds. The idea of any creature like that loose in the California woods seemed so far-fetched that Patterson was accused of fakery. He

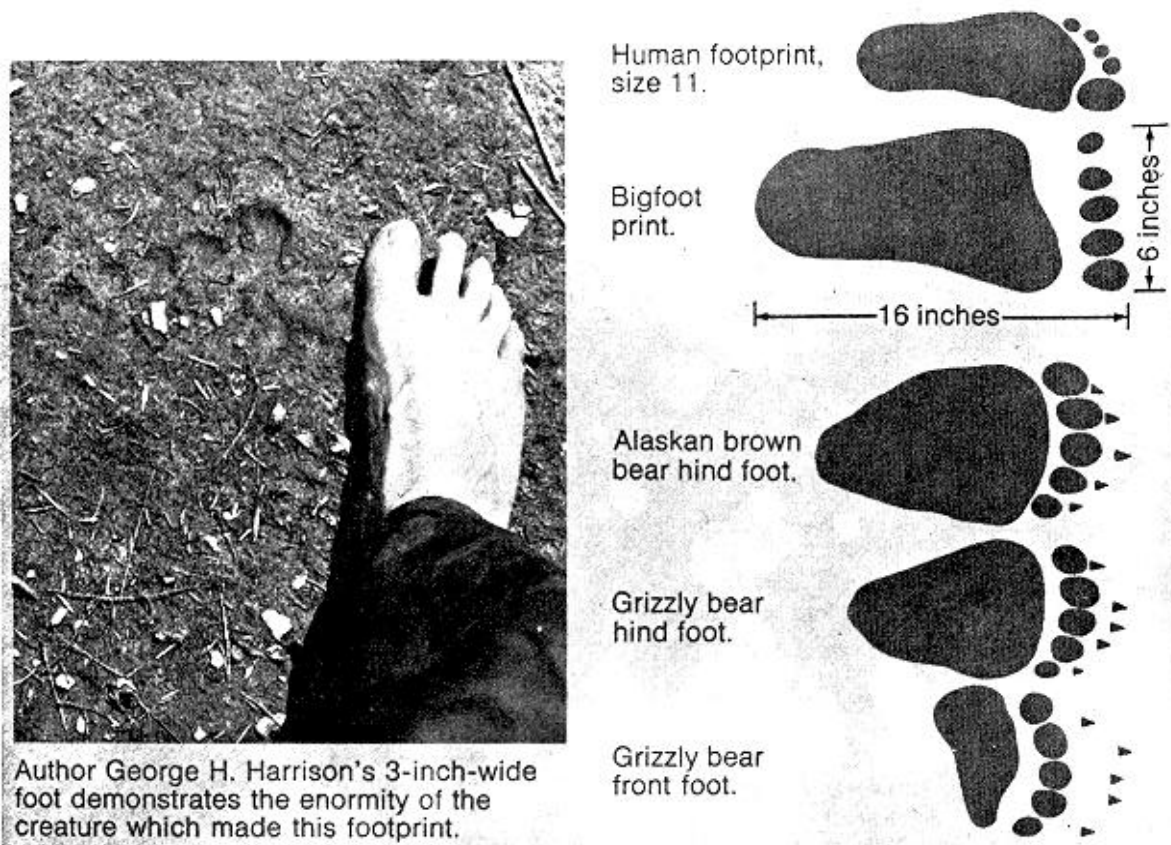


**Figure 20. Impressions of Bigfoot.** These photographs with accompanying captions are reproduced by permission from the article, "On the Trail of Bigfoot," by George H. Harrison, October-November issue of *National Wildlife*, 1970.

submitted to a lie detector test, which convinced the operators he was not lying. (Another article with "shots" from the film appeared in *National Wildlife*, April-May, 1968.)

In June, 1970, George H. Harrison, managing editor of *National Wildlife*, joined an expedition to the Buff Creek region, led by Robert W. Morgan of Miami, Florida. Probably the most impressive evidence they encountered was the series of tracks, ten in number, that appeared fairly fresh. They were sixteen inches in length and eight inches in width (see Figure 20).

Accompanying the tracks was some strange fecal material. The latter was described by a biologist as being "not cow or elk. It has to be bear, or what we are looking for." The results of the continuing search for the American "abominable snowman," "yeti" or "big foot" will be awaited with considerable interest. Harrison indicated that before the trip he was a 50% "believer" and after the expedition he became 85% "believer." Obviously, if "big foot" is really identified, we might have a descendant of the originator of the giant footprints reported in Texas.

At this point, although the press of other matters has produced a hiatus in my studies into fossil footprints, I am still keenly interested in the subject. During the early part of 1971, I will be looking at footprints in the Paluxy River area in Texas. Should the results prove fruitful they will be discussed in another report.

#### References

- <sup>1</sup>Williams, Howel. 1952. Geologic observations on the ancient human footprints near Managua, Nicaragua in *Contributions to American anthropology and history*, Vol. II, no. 53, Carnegie Institution. See also *Science Newsletter*, June 14, 1941, p. 382.
- <sup>2</sup>Schoolcraft, Henry. 1822. Communication, *American Journal of Science*, 5:223ff.
- <sup>3</sup>*American Encyclopedia*. 1778-1803, Supp. vol. 3:344.
- <sup>4</sup>*American Journal of Science*. 1838. Vol. 33:398.
- <sup>5</sup>*American Journal of Science*. 1843. Vol. 44:200, April.
- <sup>6</sup>*Science Newsletter*, 1958.
- <sup>7</sup>*Science Newsletter*, December 10, 1938.
- <sup>8</sup>*Berea Alumnus*, November, 1938, pp. 46-47, "Human-like Footprints, 250 Million Years Ago."
- <sup>9</sup>*Ibid.*, pp. 46-47.
- <sup>10</sup>*Science Newsletter*, December 10, 1938.
- <sup>11</sup>Harrison, George H. 1970. On the trail of Bigfoot. *National Wildlife*, 8(6):4ff. October-November.

## A GEO-ECOLOGICAL EXPLANATION OF THE FOSSIL RECORD BASED UPON DIVINE CREATION

RANDALL HEDTKE\*

*The fossil series is discussed and an attempt is made to explain the distribution of index fossils in various strata. Factors such as proximity to early bodies of water, preflood population size, and morphology are used to predict the relative fossil production potential of various living forms. Predictions based on these factors show a good fit with the observed order of fossils in the geologic column. This provides a non-evolutionary framework for geology. Absence of larger or more "complex" types from deeper fossil strata is attributed to unavailability of rocks rather than expanded evolutionary development. Inaccessibility and metamorphosis make deeper strata unavailable and account for the general absence of fossils from such complex creatures as mammals. The available fossil record considered together with the available rock record explains the geologic "column" without recourse to evolutionary speculation or expanded uniformitarian time scales. This model is based upon the concept of creation and the Noachian deluge.*

When examining the fossil record, some people are impressed with it as supposedly convincing evidence for the theory of evolution. It is "as it should be," they argue, in that the supposedly older fossils are of "simple" organisms, while the fossils dated more recently are of "complex" organisms.

There exists today a general preoccupation with and acceptance of evolution theory as the only plausible explanation of the fossil record. But if, as I and many others believe, all things were created by the Divine Power of God during Creation Week, then the evolutionary interpretation of the fossil record is not correct. If so, then what is the true explanation for the fossil record?

Using present day knowledge in geology and ecology, it is possible to depart from the evolutionary approach to the fossil record and explain it quite logically with commonly accepted scientific principles. The following explanation is propounded as a workable alternative to the evolutionary description of the fossil record.

### Available Fossils

Two important facts must be pointed out regarding fossil formation. The first is that nearly all fossil evidence is found in a particular type of rock called sedimentary rock. Sedimentary rocks are formed when particles or minerals originating from the breakdown of rocks are swept into bodies of water such as lakes, or oceans. These particles settle out as unconsolidated sediments which later harden into true rocks. Because of this process of settling out of water, sedimentary rocks have the distinguishing feature of being layered or stratified.<sup>1</sup> There are other sources of fossil remains such as amber, glaciers, tar pits, etc., but these sources are relatively rare. We will deal, then, only with fossils found in sedimentary rocks as do all paleontologists with the rarest exceptions.<sup>2</sup>

The second fact is that a prerequisite for the formation of any fossil formed in sedimentary rocks is that very soon after the death of an organism, it becomes buried. To remain exposed, whether on land or in water, soon results in the destruction and decomposition of the organic tissue by scavengers and micro-organisms.<sup>3</sup>

Rapid burial in sediment is a necessity in the formation of fossils, and has a direct bearing upon the fossil production potential of any group of organisms. Not all organisms have an equal likelihood of leaving fossil remains. Because of certain ecological and environmental conditions, some groups of organisms have a greater chance of being fossilized in greater number than do other groups of organisms. We may refer to this index as the Relative Fossil Production Potential (RFPP) of a species.

Although fossils may have been formed to some small extent in minor floods after the Noachian deluge, it is reasonable to believe that most of the sedimentary deposits were formed during the global flood (see Genesis 7-9). With rapid burial in sediment the primary requirement for the formation of a fossil, any organism in any niche of the preflood community might possibly have left fossil remains. It is obvious also that organisms living in an aquatic or semi-aquatic habitat would have been under optimum condition for fossil production during the flood, since they would have been most likely to sink into or become covered with advancing sediments.

### Other Fossil Formation Difficulties

When considering fossil land animals such as the reptiles, birds and mammals, additional difficulties in fossil formation are encountered. When these animals were buried, most of the carcasses would have been first scattered and destroyed by scavengers and micro-organisms. Uniformitarian geologists largely agree, stating that terrestrial organisms may not be buried at all *unless a sudden flood or freshet occurs which may also have the effect of scattering the remains*

\*Randall Hedtke, B.S., is an Instructor in Biology at Technical High School, St. Cloud, Minnesota 56301.

still more.<sup>4</sup> Proximity to water, then, would have provided a greater RFPP for aquatic organisms in the deluge than for terrestrial organisms.

Another factor to consider in determining the RFPP of a group of organisms is their population size. If all other factors influencing the RFPP of two groups of organisms were equal, the group with the largest population size would have produced the greatest quantity of fossil remains. Smaller organisms generally have the greatest population sizes. This is true because the smaller creatures require less space and energy from the ecosystem than the larger ones, and therefore a larger number of niches are available for them.

A third factor, morphology, should be considered, although its effect in determining RFPP may have been minimal. By morphology I mean the kind and quantity of tissue making up the body structure. Size and structure as factors in fossilization would have had a much more important application to land organisms than aquatic organisms because the opportunity for rapid burial is not as great for land organisms. This is true now and was probably also true during the flood event.

Remains of a terrestrial organism with a large amount of hard tissue probably would have survived decomposition longer than one with a small amount of hard tissue, thus increasing the chances of fossilization. On the other hand, a small quantity of tissue requires less sediment in which to become buried! Apparently, either an extremely large size or an extremely small size could be beneficial in fossil production.

An example as to how structural composition may influence RFPP comes from palynology—the study of pollen grains. Fossil evidence of pollen grains and microspores may be quite abundant in some rock strata, while evidence of the parent plants in the same stratum is completely absent. Population size alone could account for this phenomenon, since the number of pollen grains must be millions of times greater than that of the parent plants. But an additional influencing factor may be that the outer walls of spores are especially resistant to decomposition.<sup>6</sup>

One must conclude that the extent of the specific influence of the size and structure factor upon the RFPP of a group of organisms is difficult to determine.

Habitat, population size, and size and structure of the organism are the three main factors that influenced the Relative Fossil Production Potential of the preflood groups of organisms. It can be summarized in the following qualitative equation:

$$\begin{aligned} &\text{habitat} + \text{population size} \\ &+ \text{size and structure} = \text{RFPP} \end{aligned}$$

For example, a creature that was near the water, that came from a large population, and

that was structurally resistant to decay would have been more readily fossilized than one which was terrestrial, from a small population and/or had a structure prone to decay.

**Application of Relative Fossil Production Potential Upon Index Fossil**

In the fossil record, many organisms are often referred to as index fossils. They include the following groups of organisms: insects, fishes, mammals, invertebrates, reptiles, protozoans, amphibians, and birds. If the above equation is applied to the index organisms, we can determine the RFPP for each group and compare it to their stratigraphic arrangement in the fossil series.

Using the first factor, habitat, the groups may be arranged in a column with those in or nearest water at the bottom.

|               |             |
|---------------|-------------|
| birds         |             |
| mammals       | primarily   |
| insects       | terrestrial |
| reptiles      |             |
| <hr/>         |             |
| amphibians    |             |
| protozoans    | primarily   |
| fishes        | aquatic     |
| invertebrates |             |

Notice that the column can be divided into two convenient groups—those that are primarily aquatic and those that are primarily terrestrial. These two groups should be given separate consideration in any further rearrangement because the groups that are primarily aquatic would have had a definite advantage in fossil production over the groups that are primarily terrestrial. Their vertical order in this sequence (sometimes called the “Principle of Faunal Succession”) could thus relate to their proximity to bodies of water before the flood and not to the supposed long ages of fossil history.

Applying the next factor, population size, the column may be rearranged as follows with descending order from least to most easily fossilized:

| Index Fossils | Number of Known Species |             |
|---------------|-------------------------|-------------|
| mammals       | 4,500 <sup>7</sup>      |             |
| birds         | 9,000 <sup>8</sup>      | primarily   |
| reptiles      | 5,000 <sup>9</sup>      | terrestrial |
| insects       | 800,000 <sup>10</sup>   |             |
| <hr/>         |                         |             |
| amphibians    | 2,000 <sup>11</sup>     |             |
| fishes        | 30,000 <sup>12</sup>    | primarily   |
| invertebrates | 236,000                 | aquatic     |
| protozoans    | 30,000 <sup>13</sup>    |             |

After each index group the number of known species is recorded. No one could possibly know the exact population sizes for these groups before the flood, but the number of species known at present may serve as an index of their relative population sizes. The interpretation of population size is, of course, the larger the population

size the larger the quantity of fossils produced in the flood and now available for discovery. (It should be pointed out that the figure for the known species of invertebrates includes the following phyla: Porifera—5,000 sp.<sup>14</sup>, Coelenterata—9,000 sp.<sup>15</sup>, Arthropoda—(except Class Insecta) 91,000 sp.<sup>16</sup>, Echinodermata—6,000 sp.<sup>17</sup>, Mollusca—100,000 sp.<sup>18</sup>, Annelida—15,000 sp.<sup>19</sup>, and Platyhelminthes—10,000 sp.<sup>20</sup>. Only the more commonly known phyla were included in arriving at the total number of species of invertebrates.)

### Two Discrepancies Noted

There are two discrepancies in the arrangement of these groups according to population size in comparison to their arrangement in proximity to water and that is in the placement of protozoans and reptiles. Both groups immediately above these two have larger numbers of known species.

There are two reasons why protozoans should possibly be left where they are despite the fact that fewer protozoan species are known than other invertebrates. First, because they are microscopic in size, greater opportunity exists for them to become more numerous in the ecosystem than any of the other organisms listed even though fewer species are recognized. Second, many species of protozoans may not as yet have been discovered as pointed out in the following quotation from a noted zoologist:

The number of named species of Protozoa lies somewhere between 15,000 and 50,000, but this figure probably represents only a fraction of the total number of species. Some protozoologists think that there may be more protozoan species than all other species together. . . .<sup>21</sup>

The second discrepancy involves placement of reptiles before birds. The ultimate advantage in fossil production is a close proximity to water. Generally speaking, reptiles may be more closely associated with water than birds. Also in this particular situation, the third factor, **size and structure**, may make a difference. Reptiles have a tough scaly skin and some of them, like the extinct dinosaurs, had massive bone tissue; whereas, birds are generally quite fragile in structure. They have no tough outer skin except on their legs and much of their bone structure is hollow to provide for easier flight. The size and structure factor coupled with the habitat factor could raise the RFPP of reptiles above that of birds.

The index fossils are now arranged in an order according to their Relative Fossil Production Potential. The greatest RFPP is at the bottom of the column and the least RFPP is at the top (see Figure 1). The horizontal width of the band for each index group indicates its RFPP, which is

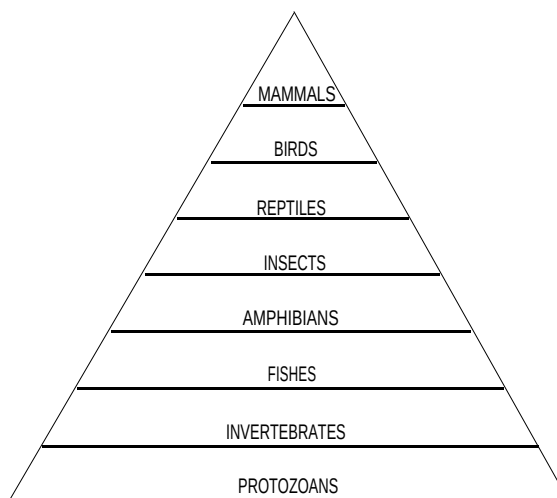


FIGURE 1. AVAILABLE FOSSILS

to say the quantity of fossils available for discovery.

It is significant and meaningful to note that the index fossils are now arranged according to the fossil record and that the concept of evolution has been *completely dismissed* in arriving at this arrangement. Instead, the principle of relative abundance and proximity to water (RFPP) before the flood has been used.

### Determining Relative Fossil Production Potential of Specific Organisms

Difficulties may be encountered when attempting to stratigraphically arrange specific kinds of organisms, rather than large representative groups, according to the RFPP factors. These difficulties are due to a lack of obvious differences in the RFPP factors among some of the organisms involved.

Let us work out the stratigraphic arrangement of the following kinds of organisms which have been related to specific rock strata: shark, cockroach, opossum, crocodile, horseshoe crab, and *Bairdia* (a tiny marine arthropod).<sup>22</sup>

The immutability of these organisms cannot be satisfactorily explained in evolutionary terms.<sup>23</sup> Fossil evidence of these organisms dates back to rock strata supposedly millions of years old; yet, they have remained apparently unchanged up to the present, according to the uniformitarian frame of reference.

These organisms also contradict the following statement by Charles Darwin: "Judging from the past, we may safely infer that not one living species will transmit its unaltered likeness to a distant futurity."<sup>24</sup> These organisms have transmitted their unaltered likeness to a distant futurity.

Beginning with the **habitat** factor, the above mentioned organisms may be arranged as follows:

|                   |             |
|-------------------|-------------|
| 6. opossum        | primarily   |
| 4. cockroach      | terrestrial |
| 5. crocodile      |             |
| <hr/>             |             |
| 1. horseshoe crab | primarily   |
| 3. shark          | aquatic     |
| 2. <i>Bairdia</i> |             |

The organisms have been numbered to indicate the way they should be arranged stratigraphically from bottom to top according to historical geologists. The habitat factor alone brings about a rough semblance of order in that the organisms numbered 1, 2, and 3 are at the bottom half of the column and organisms numbered 4, 5, and 6 are at the top half, which is stratigraphically correct so far.

A judgment in the current or past difference in the **population sizes** of opossums and crocodiles is difficult to make. If the opossum population was and is greater than that of the crocodile population, it apparently has been overshadowed by the semi-aquatic habitat of the crocodile, resulting in a greater RFPP for the crocodiles during the flood.

Conversely, the population size of cockroaches, an insect, is overwhelmingly larger and more widely distributed than that of either crocodiles or opossums, resulting in their having the greatest RFPP of the three primarily terrestrial organisms. One should also remember that, although insects are small in **size**, they are not fragile. Their tough exoskeleton often results in unusually complete fossils.<sup>25</sup> The additional influence of the population factor could rearrange the primarily terrestrial organisms in their proper stratigraphic sequence—cockroach, crocodile, opossum.

Turning to the three organisms that are primarily marine, one would have to assume that sharks, a considerably larger organism than either the horseshoe crab or *Bairdia*, would have the smallest population size of the three, resulting in a lower RFPP. When considering the horseshoe crab and *Bairdia*, it is easy to determine why they would have a greater RFPP than all of the other organisms being compared, but due to the lack of a significant difference in any of the RFPP factors, it is difficult to determine, between the two, which has the greatest RFPP. Perhaps the rate at which sediment was deposited in the marine environment had an effect upon the RFPP of some organisms.

The following list shows the accepted stratigraphic arrangement and the geological period of the organisms we have been considering.

6. Opossum — Cretaceous
5. Crocodile — Triassic
4. Cockroach — Pennsylvanian

3. Shark — Devonian
2. *Bairdia* — Ordovician
1. Horseshoe crab — Cambrian

#### Available Rocks

This explanation of the fossil record is based upon Divine Creation as recorded in the Holy Bible. It is obvious when examining the fossil record that there is not much direct evidence to support Divine Creation. There is considerable indirect evidence in that many “gaps” exist. The various groups of animals or plants appear in the strata as if they had no evolutionary ancestry.

Yet, inevitably the question arises, “If all organisms were created during Creation Week, why do we not find evidence of higher forms of life in the oldest rock strata?” The answer may rest upon the difference in the quantity of fossils produced by various groups of organisms as previously discussed. It is comparatively easier to find a million needles (protozoans) in a hay stack than it is to find one needle (mammals).

The quantity of fossils partly answers the question, but one must turn to some basic geology for additional factors. Fossil production is of no use in studying the past if the rocks in which the fossils are located are not available for examination. The quantity of available rocks determines the variety of fossils that can be discovered.

Sedimentary rocks are formed in layers and the strata formed first in the flood are at or near the bottom while those formed later are at or near the top. This stratification of sedimentary rocks makes random sampling difficult because the deeper layers are more inaccessible than the upper layers. In fact, in order to be available for extensive study, deep strata must be uplifted and exposed to the surface.<sup>26</sup>

Accessibility of rocks deserves serious consideration. For example: If the deep rock strata can be examined only to a limited extent because of their inaccessibility, then the kinds of fossil remains one will most likely find will be the kinds that are most abundant, the protozoans, invertebrates, etc., not birds and mammals. Conversely, one **can** find the comparatively rare fossils in the last-formed or more accessible strata. These upper strata can be examined more thoroughly.

To say that it is all simply a matter of chance that one cannot find the higher forms of life in the deeper strata, may not by itself be a convincing argument. One should realize, however, that after a fossil has formed, it may not necessarily remain indefinitely available for discovery because the environment in which the sedimentary rocks were formed may change, thus changing the rocks and the fossils in them. This is pointed out by a noted geologist:

Some of the rocks now visible on the surface of the earth were once buried as deeply

as ten miles down. Under such conditions of extreme pressure and heat many common minerals, especially those of sedimentary rocks, are subject to change, being stable only within a limited range of rather low pressure and temperature. Under deep burial or in other parts of the crust where unusually high temperatures or pressures prevail or where hot magmatic fluids can affect them, these minerals tend to change, slowly without melting, into other minerals more stable in the new environment. These changes are called metamorphism.<sup>27</sup>

From this one may deduce that the deeper, first-formed layers of sedimentary rocks were changed since the flood by the process of metamorphism. If the rocks were changed, what about the fossils in them?

Some metamorphosed rocks retain as relics the original structures of the parent rocks. Pebbles in a conglomerate, for example, may be preserved in the metamorphosed rock, but each pebble is usually distorted and stretched out. Fossils, too, tend to be deformed (broken or stretched) in the rare cases where they are preserved in the metamorphosed sedimentary rocks.<sup>28</sup>

So fossils are rarely found in deep metamorphosed rocks because they were destroyed or if not destroyed, distorted.

Uniformitarians hold that the oldest strata of rocks were formed during what is referred to as the Precambrian period. One author writes that it is difficult to study about Precambrian rocks because of:

the general concealment of overlying, younger rocks. In addition, most precambrian rocks have existed long enough and been buried deeply enough to have been metamorphosed and deformed, thus destroying or altering original mineral composition, sedimentary or igneous structures, and other evidence of former conditions.<sup>29</sup>

In the Biblical view, if deep fossils have been destroyed by metamorphism since the flood, then the kinds of fossils that most likely would have survived the process, and also been left as fossil evidence, would have been from organisms that had the greatest RFPP.

One other point should be made regarding fossil destruction; namely, that even if a deep stratum of rock does become uplifted or somehow exposed to the surface, it and the fossils in it may have been removed by erosion.<sup>30</sup>

In summary, primarily two factors, accessibility and metamorphism, determine the quantity of rocks available for examination. I propose another qualitative equation:

accessibility + metamorphism = available rocks

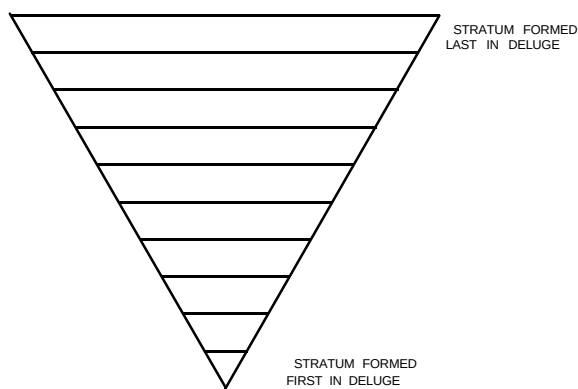


FIGURE 2. AVAILABLE ROCKS

The strata of rocks first formed are generally more inaccessible and more likely to have become metamorphosed than strata of rocks formed last. The quantity of unmetamorphosed and easily accessible upper strata of rocks should be much greater than that of deeper strata. This is illustrated in the triangle in Figure 2.

As stated previously, if examination of strata formed first in the flood is limited because of inaccessibility and metamorphism, one would most likely find only the fossil remains of organisms with the greatest RFPP. If examination of strata formed later in the flood is less limited by inaccessibility and metamorphism, one would find fossil remains of organism with a low RFPP as well as a high RFPP. This is illustrated by superimposing the available rocks triangle over the available fossils triangle as in Figure 3.

#### Interpretation of the Triangles

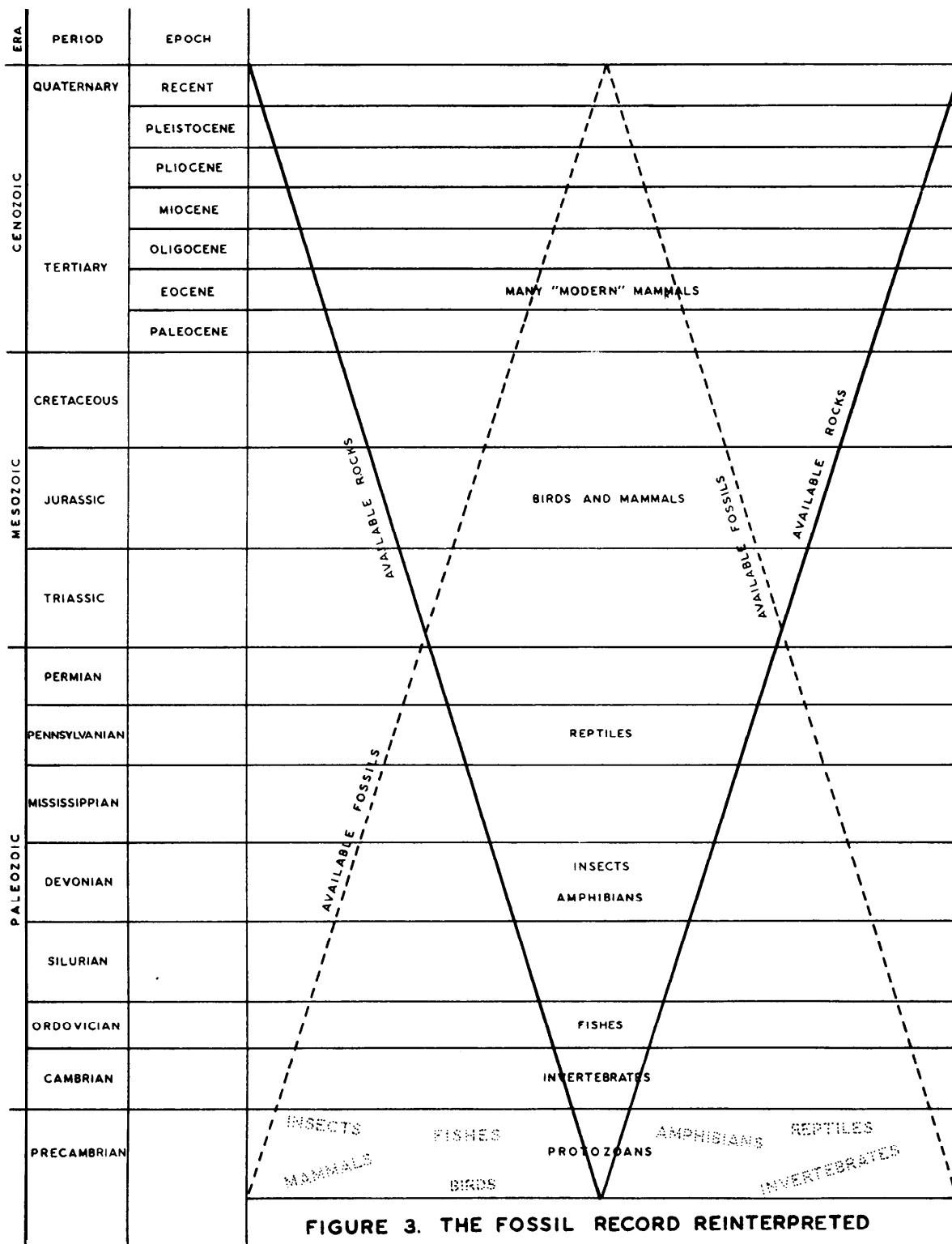
All of the index organisms existed when the Precambrian rocks were formed either before the flood or in its earliest stages. Only fossil remains of protozoans are found in the Precambrian rocks **not** because they evolved prior to the rest of the index organisms, but because they have the greatest RFPP of all the index organisms, while the quantity of available sedimentary rocks is at a minimum in that stratum.

And so it is with each of the index fossils. Fossils remains of insects were not discovered until the so-called Devonian period, because the RFPP or quantity of fossil evidence of insects along with the quantity of available rocks made discovery possible at that particular stratum and not a deeper stratum. A third equation encompasses these ideas:

$$\begin{aligned} &\text{Available Fossils} + \text{Available Rocks} \\ &= \text{Known Fossil Record} \end{aligned}$$

#### Notes on the Fossil Record

It has been estimated that the fossil record which we have today (an accumulation of fossil discovery since the eighteenth century) may



represent no more than 1% of the possibly ten million species of plants and animals that may be preserved in rocks.<sup>31</sup> That being the case, and if this explanation of the fossil record is correct, one would expect, as more rocks are examined, a gradual shift downward in the stratigraphic arrangement of the fossil evidence. Over the years, that has been the trend. Thus many organisms may have lived at an **earlier** date than was once believed. The following organisms are a few examples of that trend:

1. *Neocalamites* (Equisetales)—Remains of this plant were previously known from the Devonian to the end of the Paleozoic. This reference reports them as being found in upper Triassic age strata, although most of the remains are very fragmentary. It will be noted that in this case the stratigraphic range is extended upward.

2. *Ogygopsis*—A trilobite genus—heretofore known in the Midcambrian and now extended downward to the upper part of the Lower Cambrian of the Canadian Rockies region.

3. *Eryops*—a labyrinthodont amphibian. the stratigraphic range of this animal has been extended from the Permian down into the Pennsylvanian period.

4. *Anisus pattersoni* (a freshwater snail). Earlier restricted to the Pleistocene; now found in the upper Pliocene epoch as well.

5. *Sphenodontids* (reptiles of Triassic period)—Footprints of this reptile have now been found in Triassic period sediments, and the author contends it is only a matter of time until true fossil remains are uncovered.

6. Early Seed Plants — gymnosperms — which are plants characterized by naked seeds and include the seed ferns, conifers, and cycads. Reference is made here to the fact that the gymnosperms first appear in the early lower Carboniferous periods some 250 million years ago. However, the reference states that it will not be surprising if the gymnosperms eventually are traced back to the underlying Devonian period. The author states that the first generally accepted flowering plants have been found in the mid-lower Cretaceous, but fossils that have been attributed to this group come from the Jurassic and Triassic, and a few botanists have expressed the opinion that they originated as far back as the Permian.

It is apparent from the above data that the changes involving the stratigraphic position of fossils are of minor magnitude, for the most part. In other words, the first appearance of a particular fossil may be shifted downward on the time chart from one epoch

to the next older epoch or from the upper horizons of one geologic system to the mid-portions of the same system. It is questionable whether shifts involving several periods by virtue of a single new discovery will be encountered. However, as new discoveries continue to be made, this slow displacement may result in a time span of considerable magnitude.<sup>32</sup>

The fossil record chart used with this paper indicates discovery of birds and mammals in the Jurassic system. Many charts indicate discovery of fossil mammals at a slightly lower level than that of birds. This is predictable since everything points to birds and mammals as having nearly the same RFPP. Then too, mammals have a generally more massive structure which would make it more likely for them to survive fossil destruction by weathering.

### Conclusions

It is good if a theory lies within the realm of the scientific method because then it is possible to put it to a test. The test for this explanation of the fossil record could be an analysis of an extensive, random sampling of fossils from rock strata that formed after the last index fossil, mammals, supposedly evolved.

The rock strata would have to be generally easily accessible and unmetamorphosed. All of the index fossils will be discovered, of course, but I predict that they will be in the same comparative quantity as illustrated in the available fossils triangle. This test would have the effect of verifying the correlation between available fossils and available rocks.

Fossil formation and subsequent discovery, like geology and ecology, are governed by natural laws, therefore, like them it possesses a degree of predictability. I have attempted to explain the predictability of the fossil record in relation to the global flood. In doing so, the theory of evolution in general and two of its basic concepts in particular have been challenged.

Is the fossil record the most direct evidence of evolution as one paleontologist suggests?<sup>33</sup> I contend that the fossil record in scientific terms is nothing more or less than a manifestation of available fossils and available rocks. By way of ultimate correlation, the fossil record demonstrates the sequence of events during the inundations of the Genesis flood.

Does the fossil record support the popular concept that life evolved from the sea? I contend that the presence of marine forms deepest in the series is nothing more or less than a manifestation of pre-flood habitat (proximity to water).

Regardless of the dogmatic manner in which the various communications media refer to the theory of evolution and regardless of the way in

which the evolution theory is presented as a fact by authors of high school and college textbooks, its acceptance requires **faith**. The data of geology have reasonable fit with the non-evolutionary, catastrophic model presented here.

### References

- <sup>1</sup>Leet, Don L. and Sheldon Judson. 1965. Physical geology. Third Edition. Englewood Cliffs, New Jersey. pp. 91 and 92.
- <sup>2</sup>Simpson, George Gaylord. 1953. Life of the past: an introduction to paleontology. Yale University Press, New Haven and London. p. 20.
- <sup>3</sup>*Ibid.*, p. 20.
- <sup>4</sup>*Ibid.*, p. 37.
- <sup>5</sup>Simpson, G. G., Cohn S. Pittendrigh and Lewis H. Tiffany. 1957. Life: an introduction to biology. Harcourt, Brace and World, Inc. p. 623.
- <sup>6</sup>Zimmerman, Paul A., Editor. 1970. Rock strata and the Bible record. Concordia Publishing House, St. Louis and London. p. 128.
- <sup>7</sup>Hickman, Cleveland P. 1966. Integrated principles of zoology. Third Edition. C. V. Mosby Co., St. Louis. p. 536.
- <sup>8</sup>*Ibid.*, p. 509.
- <sup>9</sup>*Ibid.*, p. 464.
- <sup>10</sup>Storer, Tracy I. and Robert L. Usinger. 1965. General zoology. Fourth Edition. McGraw-Hill, Inc. p. 466.
- <sup>11</sup>Hickman, C. P. *Op. cit.* p. 455.
- <sup>12</sup>*Ibid.*, p. 436.
- <sup>13</sup>*Ibid.*, p. 110.
- <sup>14</sup>*Ibid.*, p. 146.
- <sup>15</sup>*Ibid.*, p. 158.
- <sup>16</sup>Storer, T. I. and R. L. Usinger. *Op. cit.* p. 455.
- <sup>17</sup>Hickman, C. P. *Op. cit.* p. 373.
- <sup>18</sup>Weiz, Paul B. 1966. The science of zoology. McGraw-Hill Book Co. p. 621.
- <sup>19</sup>*Ibid.*, p. 651.
- <sup>20</sup>*Ibid.*, p. 566.
- <sup>21</sup>Hickman, C. P. *Op. cit.* p. 110.
- <sup>22</sup>Newell, Norman D. Feb. 1963. Crises in the history of life, Scientific American, 208, No. 2:77.
- <sup>23</sup>Volpe, Peter E. 1967. Understanding evolution. Wm. C. Brown Company Publishers, Dubuque. p. 140.
- <sup>24</sup>Darwin, Charles. 1859. The origin of species. Random House, Inc., New York. p. 373.
- <sup>25</sup>Simpson, G. G., Colin S. Pittendrigh and Lewis H. Tiffany. *Op. cit.* p. 743.
- <sup>26</sup>Simpson, G. G. *Op. cit.* p. 25.
- <sup>27</sup>Fagan, John J. 1965. View of the earth: an introduction to geology. Holt, Rinehart and Winston, Inc. p. 161.
- <sup>28</sup>*Ibid.*, p. 164.
- <sup>29</sup>*Ibid.*, p. 388.
- <sup>30</sup>Simpson, G. G. *Op. cit.* p. 37.
- <sup>31</sup>Zimmerman, Paul A. *Op. cit.* p. 130.
- <sup>32</sup>*Ibid.*, pp. 127-128.
- <sup>33</sup>Simpson, George G. 1961. Horses. Doubleday and Company, Inc. Garden City, New York. p. 220.

### NEW PUBLICATIONS

*The Creation of Life* (A Cybernetic Approach to Evolution) by A. E. Wilder Smith, D.Sc., Ph.D., Dr. es. SC., F. R. I. C., Professor at the University of Illinois at the Medical Center, Chicago. Harold Shaw Publishers, Wheaton, Illinois, 1970.

In *The Creation of Life* Dr. A. E. Wilder-Smith probes the varied means by which scientific materialists have attempted to solve some problems. He finds their answers far from convincing. Further, he approaches this vital and fascinating area of controversy from a new angle. Bringing to bear recent and startling evidence supplied by the computer sciences he proves that information and order, including that of life itself, is *always the result of intelligence rather than chance reactions*.

*The Creation of Life*, like its predecessors, *Man's Origin*, *Man's Destiny* and *The Drug Users*, is a disturbing book. It should be read by those who are prepared to think through, without bias or preconception, evidence which may radically modify their view of life and its meaning.

\* \* \* \* \*

"In *The Creation of Life* Dr. Wilder Smith evaluates the practicing evolutionist's experimental design and data. In advancing the resolution of reasonable scientific deductions from pseudo-scientific extensions of simple experimental findings he provides the type of necessary balance not normally found in enclaves under the influ-

ence of Neo-Darwinianism and scientific materialism. His logical application of evolutionary principles to the field of cybernetics yields significant insights. This volume should take its place beside *Man's Origin*, *Man's Destiny* in the library of the concerned student of scientific thought."—John W. D. Kay, Ph.D., Senior Research Biochemist

\* \* \*

*Nomogenesis or Evolution Determined by Law* by Leo S. Berg. Original Russian edition, 1922. First published by Constable and Company, Ltd., London, 1926. Paperback (MIT 109), The Massachusetts Institute of Technology Press, Cambridge, Massachusetts, 1969.

Charles Darwin's theory of natural selection has since its earliest days drawn toward itself both fierce followers and fierce dissenters. Russian scientist Leo Berg was of the later. Disturbed by the element of chance in the Darwinist theory (the survival of those who are, quite by accident, the fittest and best adapted), he posed nomogenesis in its stead, built on the *analogy* (emphasis added) between individual development (ontogeny) and evolutionary development (phylogeny).

From Foreword by Th. Dobzhansky, dated 1968:

Berg's book would be of only limited interest had he confined himself to expression of

(Continued on Page 230)

## THE MESA BASALT OF THE NORTHWESTERN UNITED STATES

STUART E. NEVINS\*

*Probably the most remarkable basalt unit of the stratigraphic record is the late Cenozoic (Pliocene or Pleistocene) Mesa basalt of the northwestern United States. Various lines of evidence show that several occurrences of medium to light gray porous-textured olivine basalt in Oregon, northeastern California, northwestern Nevada and southwestern Idaho apparently are the preserved remnants of a single, regionally extensive lava flow. The thickness of the flow averages only 30 feet and the areal extent must have exceeded 100,000 square miles. It is therefore the world's largest known lava flow representing a single volcanic event of catastrophic magnitude.*

*Several problems for uniformitarian geology presented by the Mesa basalt are discussed. Widely divergent dates on various portions of the basalt seem to invalidate the potassium-argon dating method.*

*Because the Mesa basalt and many other late and middle Cenozoic basalts were deposited in a subaerial environment, while pre-cenozoic lava flows were usually submarine, it is suspected that the Mesa basalt and other late and middle Cenozoic basalts flowed after the Noachian Flood. This inference is supported by the observation that pre-cenozoic flood strata (widespread dolostone, bedded chert, black shale, coal and graywacke) are uncommon in the late and middle Cenozoic.*

### Introduction

The late Cenozoic geologic history of the northwestern United States was rather violent. From innumerable fissures and craters enormous quantities of molten rock and ash spewed forth. The dark, fine grained rock called basalt, which is composed mainly of minerals called feldspars,  $(\text{Na,Ca})\text{Al}(\text{Si,Al})\text{Si}_2\text{O}_8$  cooled from molten lava.

The Columbia Plateau in Washington, Oregon, Idaho, and California is built of volcanic material in some places over five thousand feet thick dominated by basalt flows each about 10 to 15 feet thick, with an occasional one of greater thickness.

The most common topographic features of the Columbia Plateau are buttes, mesas and plateaus capped by resistant "rim-rock" (commonly basalt) over less resistant rock (commonly volcanic ash) which is easily eroded by wind and rain.

The Cascade Mountains in Washington, Oregon and California contain a series of volcanoes, the best known of which are Mount Baker, Mount Rainer, Mount St. Helens, Mount Hood, Mount Jefferson, Mount Shasta and Mount Lassen, each over 10,000 feet high.

### Recognition of Mesa Basalt

Two professors of geology at the University of Washington in Seattle, Washington, Dr. Harry E. Wheeler and Dr. Howard A. Coombs, have each spent forty years carefully studying the late Cenozoic volcanic rocks of the Northwest. Dr. Wheeler's specialized field is the analysis of the regional patterns of stratified rocks. Dr. Coombs, who was head of the department of geology at the University of Washington, is a specialist in volcanology. Both are recognized world-wide as authorities in their fields.

About ten years ago Wheeler and Coombs noticed that one particular type of Pliocene or

Pleistocene basalt was widespread east of the Cascade Mountains in Oregon, California, Idaho and Nevada forming the rim-rock of many of the buttes, mesas and plateaus. This characteristic type of basalt is usually medium to light gray in color and differs from other basalts which are usually black.

Wherever Wheeler and Coombs found this distinctive type of basalt, it was always coarse-textured with visible crystals of olivine, a green mineral,  $(\text{Mg,Fe})_2\text{SiO}_4$  protruding into many fine pores. (The texture is technically known as *diktytaxitic*.) Upon close inspection of unweathered samples one can distinguish what appears to be a "jumble of minute jackstraws." Wheeler and Coombs have named this peculiar layer of rock the *Mesa basalt* according to the first description made by the University of California Professor J. C. Merriam in northwestern Nevada in 1910.

After recognizing the vast distribution, the thickness which averages only 30 feet, and the singular stratigraphic occurrence in any locality of the *Mesa basalt*, Wheeler and Coombs asked,

Could this layer of "jackstraw" rock, vestiges of which were scattered over parts of four states, conceivably be the remains of a single sheet? Could such a sheet have been laid down during one enormous volcanic eruption? After initially dismissing the idea as preposterous, we later evaluated it as belonging somewhere between the improbable and the impossible. A number of lava flows had been known to travel tens of miles from their sources. J. W. Bingham and M. J. Grolier of the U. S. Geological Survey recently showed that one flow of the Columbia River Basalt succession covered at least 20,000 square miles of southeastern Washington and northeastern Oregon. However, to assign the *Mesa basalt* layer to a solitary

\*Stuart E. Nevins holds a B.S. degree in geology.

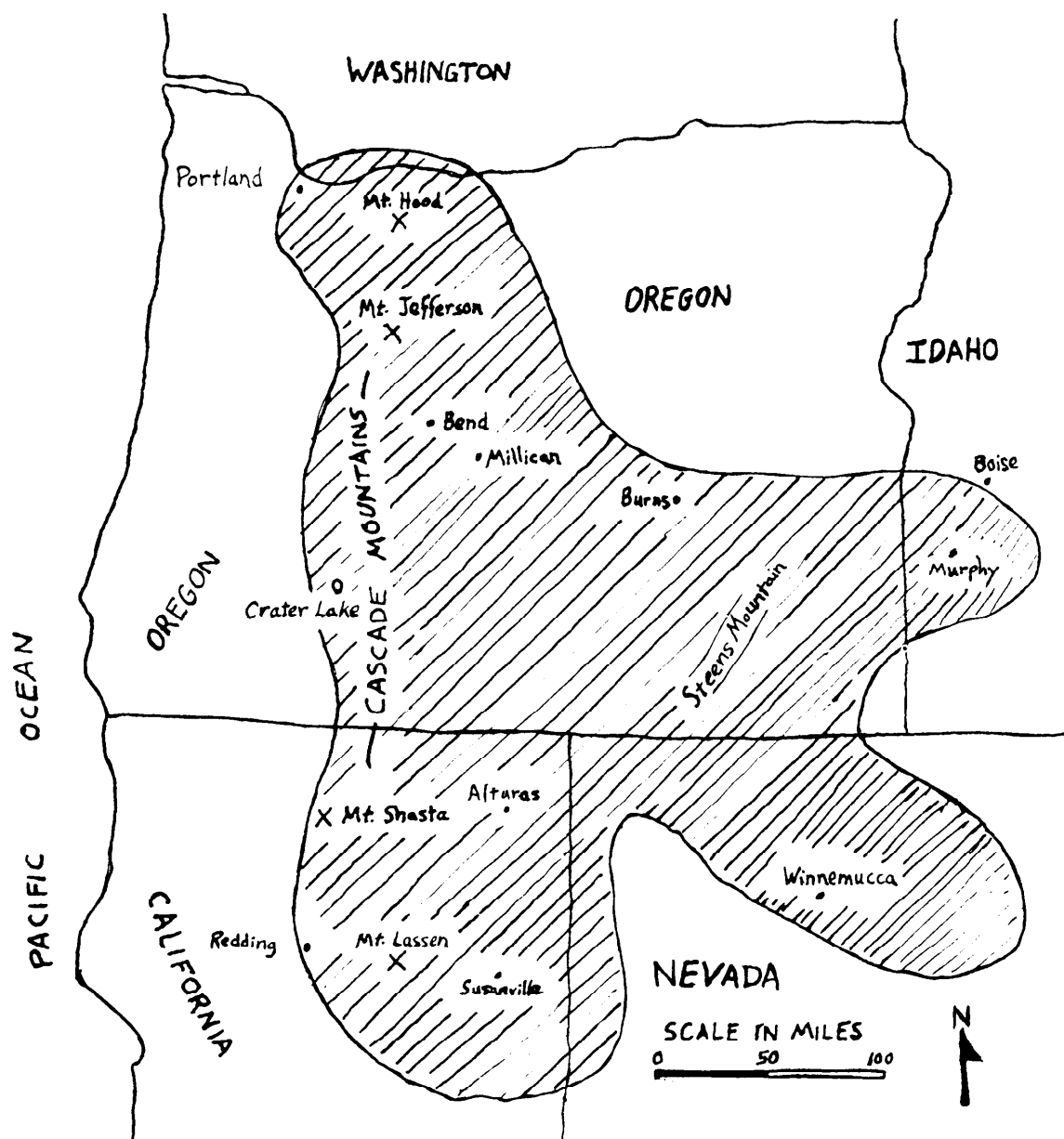


Figure 1. The world's largest known lava flow. The area of this lava flow is shaded on the map. It covered an estimated 100,000 square miles in Oregon, Idaho, California and Nevada.

eruptive event (even if two or three outbursts in rapid succession were assumed) would be equivalent to saying that the flow was so gigantic that portions of it had to come to rest, cooled, and solidified no less than a few hundred miles from the place of eruption. How could any one outpouring of molten rock traverse such a distance before cooling?<sup>1</sup>

Subsequent mapping by Wheeler and Coombs has shown the extremely vast distribution of the *Mesa basalt* (See Figure 1).

Although some of the earlier correlations tentatively proposed in the literature suggested a possible original continuity of *Mesa basalt* considerably in excess of 100 miles, there was no appreciation of the total sweep of the erosionally reduced remnants our everwidening search has uncovered during the last five years. Our recently completed geologic mapping in Oregon reveals at least two areas, each with continuous exposures for more than 100 linear miles. In central Oregon, the *Mesa* sheet may be kept either

under-foot or in virtually continuous view for 150 miles from southwestern Wasco County on the east slope of the Cascades to Wright's Point Mesa southeast of Burns in north-central Harney County. *Mesa basalt* exposures are equally continuous from near the southeastern base of Mount Shasta in Siskiyou County, California, for a distance of 90 miles southeast across the low crest of the southern Cascades to Susanville in Lassen County. If one will allow five erosional separations of present flow remnants (in which the two largest gaps are only ten and twelve miles), a minimum lateral extent of 250 miles is clearly evident. . . . We are now convinced that what we see of the *Mesa basalt* layer today is only a modest fraction of the original sheet of lava. The major portion of the sheet has been eroded away. The remnants are distributed from near Portland, Oregon, southeasterly to beyond Winnemucca, Nevada, a distance of more than 450 miles. In the northeast-southwesterly direction they occur from near Murphy in the Snake River Valley (south of Boise), Idaho, to near Redding in the northern Sacramento Valley of California. The minimum region encompassed is conservatively estimated at 100,000 square miles.<sup>2</sup>

Near Portland, Oregon, the *Mesa basalt* is over 60 feet thick; in central Oregon near Bend about 35 feet; in Modoc County, California, about 29 feet; in southern Lassen County, California, about 22 feet; near Winnemucca, Nevada, a little over 10 feet; in western Idaho about 16 feet thick. The regional thickness gradation of the *Mesa basalt* from thickest in the northwestern most portion (near Portland, Oregon) to thinnest in the southeastern most portion of the sheet (near Winnemucca, Nevada) suggests that the fissure which fed the lava layer was located to the northwest of the entire sheet.

To support their interpretation of the *Mesa basalt* as a single, vast basalt flow, Wheeler and Coombs have also noted similarities in chemical composition, resemblances among volcanic structures, and regionally associated stratigraphic relationships. After mentioning several physically associated characteristics of the *Mesa basalt*, Wheeler and Coombs correctly claim, ". . . these are immediately recognized as the diagnostic physical criteria for the identity, original continuity, and genetic unity of any lithostratigraphic unit (sedimentary or volcanic) . . ."<sup>3</sup>

Many geologists today use fossils or radiometric methods to demonstrate stratigraphic equivalence of layered rocks in separate localities and have relatively ignored the most conclusive method, that of physical stratigraphic similarity. This incredible oversight by geologists during

the last 60 years is one of the main reasons why the vast distribution of the *Mesa basalt* has only been recently appreciated.

### Special Problems Presented by Mesa Basalt

Since the entire sheet of *Mesa basalt* cooled from a lake of molten lava at roughly the same moment, it is a convenient time datum to check the accuracy of potassium-argon dating. Two U. S. Geological Survey geologists, G. W. Walker and D. A. Swanson, have mentioned several dates which were made before the widespread nature of the *Mesa basalt* was recognized.<sup>4</sup>

In northern Nevada where the *Mesa* was first described by Merriam, the potassium-argon method dated the basalt at 1.2 million years. A date of 7.2 million years came from the basalt near Alturas, California. Near Millican, Oregon, the basalt dated at slightly over 6 million years. An occurrence of diktytaxitic olivine basalt not originally recognized by Wheeler and Coombs as part of the *Mesa basalt* on Steens Mountain in southern Oregon was dated at 14.5 million years.

In view of these and other widely divergent potassium-argon dates and the more conclusive evidence of Wheeler and Coombs for a single *Mesa basalt* flow, we must conclude that the potassium-argon dating method is unreliable.

Walker and Swanson, however, place their faith in the potassium-argon method and believe that the various occurrences of diktytaxitic basalt mentioned by Wheeler and Coombs represent dozens of smaller, individual lava flows separated by millions of years of time. Walker and Swanson claim that the supposed evolutionary order of vertebrate fossils confirms potassium-argon dating, and conclude (erroneously) that Wheeler and Coombs are in serious error concerning the existence of their regionally extensive *Mesa basalt*.

Not only are potassium-argon dating and evolutionary interpretations of late Cenozoic fossils in grave difficulty, but the basic popular assumption in historical geology is in serious question. The *Mesa basalt* is an outright contradiction of the so-called Principle of Uniformity.<sup>5</sup> The flowage of the *Mesa basalt* represents the largest lava flow known and far exceeds any of the present. The catastrophic outpouring of the *Mesa basalt* very possibly took only a few days.

One of the most perplexing difficulties presented by the *Mesa basalt* is its horizontal extent compared to thickness. As an illustration of the remarkable thinness of the *Mesa* compared to its widespread flow, imagine that the actual thickness of the flow were reduced in scale to the thickness of a page of this *Quarterly*. In order to represent to scale the maximum horizontal dimension of the flow, the page would have to be 20 feet long! Wheeler and Coombs write,

We confess ourselves no better prepared than Merriam was to explain the mode of long-distance transport of the *Mesa basalt*. We still must ask how (or whether) any lava flow (in the *normal* sense of the term) can remain sufficiently hot and fluid while being spread so widely—especially across a terrain with appreciable topographic relief. . . . It seems only logical to speculate that the *Mesa basalt* also may not have been a lava flow in the completely conventional sense.<sup>6</sup>

In their recent geology textbook Dunbar and Waage report,

One very destructive flow, the Mesa Basalt, so called because it caps so many of the mesas in parts of 3 states, has recently been stated to have covered approximately 100,000 square miles, although it is generally less than 40 feet thick. The mechanism by which it was able to spread so widely before congealing is unknown, but as a molten lake of this size it must have presented a lurid scene such as the earth has seldom seen.<sup>7</sup>

The rock just below the *Mesa basalt* is remarkable because it must have formed a nearly level planar surface of at least 100,000 square miles over which the lava could have flowed. If any considerable topography existed in the 100,000 square mile area, the molten lava would have "pooled" or been deflected and drained off, and would not have spread so evenly over such a broad surface. The vast plane of flow we imagine for the *Mesa basalt* is in striking contrast to the present mountainous topography of the region.

The vast planar surface can be explained best by the ash beds which lie immediately below the *Mesa*. Enormous volcanic eruptions seemed to have blanketed the entire area with ash filling in the topography which existed previous to the flow of the *Mesa basalt*. Then, almost immediately, before streams had eroded canyons in the ash, the molten lava blanketed the vast area.

While most of the outcrops of *Mesa basalt* occur east of the Cascade Mountains, some outcrops are found west of the Cascades near Portland, Oregon, and near Redding, California. These facts can only mean that the Cascade Mountains have been uplifted *after* the flowage of the *Mesa basalt*! Thus, the Cascades, contrary to what many geologists have supposed, are among the most recent geologic features and probably were uplifted just prior to the glaciation of the Northwest.

#### **Mesa Basalt and Noachian Flood**

It is the opinion of the author that the *Mesa basalt* as well as many other Cenozoic basalts flowed *after* the Noachian Flood. The *Mesa basalt* could not have flowed *during* the flood otherwise it would have been "quenched" by the

waters and could not have spread so broadly.

Other Cenozoic basalts that the author has inspected show various evidences of subaerial accumulation such as widespread flow, development of columnar structures which is an evidence of slower cooling, and lack of rounded masses called pillow structures caused by rapid cooling in water. Included in the author's study are the widespread Columbia River basalts (Miocene), the basalts of the John Day formation (Oligo-Miocene) and those of the Clarno formation (Eocene).

Certain types of Cenozoic ash deposits also could not have accumulated in the waters of the flood. The best example is welded tuff. Some of these deposits which are over 60 feet thick were amassed so rapidly that the ash at the top of the deposits has trapped the heat and gases of the ash below and have flattened and "welded" fragments of pumice at the base. If these ash deposits had accumulated underwater the heat and gases could not be retained and the fragments would not be welded.

In the opinion of the author many of the Precambrian, Paleozoic and Mesozoic volcanics, which were deposited before the Cenozoic volcanics, show many evidences of accumulation simultaneous with flood conditions. These precenozoic volcanics in many cases have lava which has been extruded underwater and has quickly cooled forming pillow structure. Dunbar and Waage in their historical geology text comment on the Precambrian metamorphosed volcanics of the Canadian Shield, as follows:

Metamorphosed lavas take on a greenish color from certain minerals produced in their alteration and are commonly called greenstones. Alteration, however, has not completely obliterated the structure that proves they were surface flows. Pillow structure, formed by sudden chilling where viscous lava flows into standing water, is a common feature. . . . The frequency with which pillow structure occurs in the greenstones of the shield indicates that these enormous masses of lava were extruded into water, presumably into the seas of the time.<sup>8</sup>

In the northeastern United States and in New Brunswick and Newfoundland, Paleozoic volcanic rocks are common. Dunbar and Waage say,

In a local basin about Westport, Maine, layered volcanics have the impressive thickness of some 10,000 feet. In part these were submarine, for interbedded lenses of sediments include marine fossils. These date the volcanics as Silurian. Farther to the northeast, about Black Cape on the New Brunswick coast of Chaleur Bay, the Silurian sedimentary formations have a thickness of about 8000 feet, all exposed in the sea cliffs,

and in the midst of the Middle Silurian beds is a thickness of about 4000 feet of black lava flows (whence the name Black Cape). The basal flow poured out over the sea floor engulfing corals and brachiopods which are still well preserved. Here a geologist may have the unusual experience of collecting marine fossils in igneous rock. In north central Newfoundland, where the Silurian section is very thick and is all detrital, it includes some 1600<sup>9</sup> feet of rhyolitic and andesitic lava flows.

The Mesozoic Franciscan formation of western California has volcanic rocks all of which are claimed to have been deposited in a submarine environment at great depth. The catastrophic significance of the volcanics, sandstones and precipitates of the Franciscan formation was discussed recently by Dr. Bernard E. Northrup.<sup>10</sup> Also, the Metchosin volcanics of Olympic National Park, Washington, which are thought to have been deposited during the Paleocene early in the Cenozoic Era, were extruded under water.

Sedimentary rocks associated with many of these water-laid Precambrian, Paleozoic and Mesozoic volcanics show abundant evidences of catastrophic deposition under flood conditions. Commonly encountered Precambrian, Paleozoic and Mesozoic rocks such as widespread dolostone, bedded chert, black shale, coal and graywacke can be best explained in most cases by flood deposition.<sup>11</sup> The pan-continental distribution of some sandstone, limestone and shale beds is a striking feature of the Paleozoic and can be most simply accounted for by flood deposition. In terms of our thinking that many of the Cenozoic rocks were deposited *after* the flood, it is noteworthy that in late and middle Cenozoic strata widespread dolostone, bedded chert, black shale, coal and graywacke are rare. This agrees with our original observation that pre-cenozoic lava flows are generally submarine while late and middle Cenozoic flows are commonly subaerial.

#### Summary

Important events in the geologic history of the northwestern United States include:

First, the Noachian Flood which deposited great thicknesses of pre-cenozoic sedimentary rocks;

Second, the building of the Columbia Plateau by a series of Cenozoic basalt flows and ash falls after the flood waters had subsided;

Third, an enormous volcanic eruption spread a layer of molten rock (the *Mesa basalt*) averaging 30 feet thick over parts of Oregon, Idaho, California and Nevada, covering an estimated 100,000 square miles;

Fourth, the uplift of the Cascade Mountains occurred;

Fifth, volcanoes developed on the crests of the Cascades, glaciers covered much of the region, and flooding streams quickly carved canyons leaving buttes and mesas.

Many questions about the *Mesa basalt* still remain unanswered. How did the *Mesa basalt* spread so widely? How many years after the flood did the flow of the *Mesa* occur? Further investigation may supply the answers.

#### References

- <sup>1</sup>Wheeler, Harry E., and Howard A. Coombs. 1968. 100,000 square miles of burning rock. *Saturday Review*: 60-61. October 5.
- <sup>2</sup>*Ibid.*, pp. 61-62.
- <sup>3</sup>Wheeler, Harry E., and Howard A. Coombs. 1967. Late Cenozoic mesa basalt sheet in northwestern United States. *Bulletin Volcanologique* 31:23.
- <sup>4</sup>Walker, D. W., and D. A. Swanson. 1969. Discussion of paper by H. E. Wheeler and H. A. Coombs, Late Cenozoic mesa basalt sheet in northwestern United States. *Bulletin Volcanologique* 32:582.
- <sup>5</sup>The principle of uniformity specifies the uniformity of process rates or material conditions through geologic time, and the invariance of natural laws in space and time.
- <sup>6</sup>Wheeler and Coombs, *Op. Cit.*, p. 62.
- <sup>7</sup>Dunbar, Carl O., and Karl M. Daage. 1969. Historical geology. John Wiley & Sons, Inc., N. Y. p. 425.
- <sup>8</sup>*Ibid.*, p. 137.
- <sup>9</sup>*Ibid.*, p. 223.
- <sup>10</sup>Northrup, Bernard E. 1970. Book review: Franciscan and related rocks and their significance in the geology of western California. *Creation Research Society Quarterly* 6(4):161-171. March.
- <sup>11</sup>Nevins, Stuart E. (in press). Stratigraphic evidence of the flood. (in) Symposium on creation III. Edited by Donald Patten. Baker Book House, Grand Rapids, Michigan.

#### NEW PUBLICATION

"Creation, Evolution and the Christian Faith" (Pamphlet of 31 pages) by Richard Acworth. Evangelical Press, 136 Rosendale Road, London, 1969.

The author outlines main attempts to reconcile Christianity with the theory of evolution, and subjects the evidences generally put forward for evolution to careful examination.

He concludes, "Christians have been far too credulous in accepting the assertions of evolu-

tionists; and, as a result, they have allowed themselves to be stampeded into accepting a theory which, as we have seen, has not been proved, and which contradicts the whole biblical teaching as to the relationship of God, man and the world." (p. 29)

This pamphlet reproduces the substance of a Lecture given by Richard Acworth at Westminster Chapel on November 3, 1969. The author is an Anglican clergyman, and the son of the late Captain Bernard Acworth, a distinguished opponent of the theory of evolution.

## DOOYEWEERD AND CREATIONISM

SAMUEL T. WOLFE\*

Current interest in the Cosmonomic philosophy of Herman Dooyeweerd warrants an analysis of this system in terms of special creationism. Dooyeweerd's views are explained and their implications for biology are explored. It is suggested that a consistent development of Dooyeweerd's "non-evolutionary religious root" in science should lead to nothing less than Biblical Creationism.

The position of Herman Dooyeweerd has yet to be presented in its full dimension to the American mind. Abraham Kuyper, the great theologian, founded Amsterdam Free University and left Dooyeweerd as one of his outstanding successors.

Dooyeweerd's great work is his *New Critique of Theoretical Thought*.<sup>1</sup> This imposing book is primer for the so-called Cosmonomic school of thought which is now very influential throughout Dutch Reformed circles.

Dooyeweerd's work affords a unique reflection of the entire spectrum of life. He presents the whole corpus of theoretical thought within its natural setting. This results in a highly enlarged awareness of total reality. There is a new Archimedean leverage point from which theoretical thought can be apprehended as one block. And what emerges for Dooyeweerd is a hierarchy of progressive complexities.

Such thought regarding hierarchies is not foreign to the modern mind. For example, the renowned evolutionist George Gaylord Simpson writes of a biological hierarchy of complexities extending level by level from atom through cells and populations to total environment.<sup>2</sup> Dooyeweerd's hierarchy is still more embracing. It begins with time and space, goes from inorganic to organic, through growing complexities of human intellectual patterns reaching finally to faith and love. For brevity a highly concentrated summary of such spheres as Dooyeweerd has thus far analyzed is presented in Figure 1.

This theoretical spectrum is also distinguished as an inter-modal coherence. By this we understand that every sphere has an anticipatory phase pointing toward the next higher sphere. The clearest example of this is seen in the anticipatory phase of the first or numerical sphere heralding the second or spatial. Those familiar with mathematics will readily discern that the more complex functions have a spatial orientation and are anticipatory of the spatial and next-higher sphere.

But the significance of such coherence is concealed, argues Dooyeweerd, save to those whose minds are irradiated by Holy Scripture. The mind must be subject to Christ at every juncture. If the mind dares attempt to be "autonomous,"

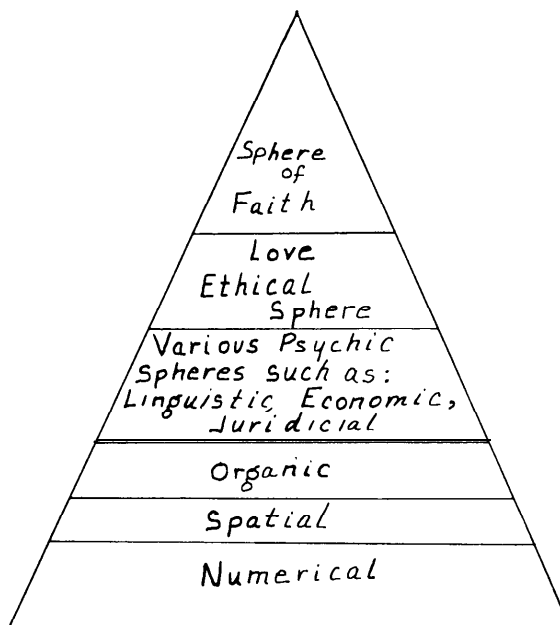


Figure 1. Diagram of the sequential spheres envisioned in Cosmonomic Philosophy.

or become self-centered, this signifies that pride has entered and that condemnation is inevitable. In the *New Critique* Dooyeweerd presents aberrations to the right and left as well as the correct, non-autonomous position.

In the foreword of his opus, Dooyeweerd claims to be presenting a Christian refocusing of the entire corpus of theoretical thought and that this radical, non-evolutionary religious root impregnates every aspect. Regardless of this, things have apparently changed at the Free University—and so soon! This is indicated by the fact that Dr. Jan Lever continues in apparent high regard as Professor of Zoology. For Lever (as quoted by Hebden Taylor<sup>3</sup>), evolution as a process is completely acceptable. In his book, *Creation and Evolution*, Lever affirms a scheme of origins that provides for considerable evolutionary descent<sup>4</sup>—despite the non-evolutionary assertions of Dooyeweerd's position.

Further confusion exists in that possibly the most vitriolic criticism yet to appear of *The Genesis Flood* by Whitcomb and Morris was prepared by Professor Van de Fliert of Amsterdam Free University.<sup>5</sup> Although Van de Fliert's polemic style is foreign to Dooyeweerd, it must

\*Samuel T. Wolfe is an ardent critic of evolutionism. He resides at 419 W. Alamar Ave., Santa Barbara, California 93105.

be understood that the Cosmonomic perspective differs from that of the Creation Research Society. The problem of origins is carefully skirted in the *New Critique* although Dooyeweerd issues occasional rumblings against a so-called facile accommodation between the Bible and science.

The late Dr. J. J. Duyvené De Wit was one of just a few in the Cosmonomic movement who maintained good communication with Creationists. De Wit's own view of origins, like that of his mentor, Dooyeweerd, differs somewhat from a fully Creationist stance. In one of his books De Wit mentions a study of Dooyeweerd on "Creation and Evolution" not readily obtainable in English.<sup>6</sup>

But, as De Wit quotes, Dooyeweerd makes it plain that any literal view of time-sequence in Genesis 1—whether it be 24-hour days or geological periods—is out of line with the Cosmonomic perspective.<sup>7</sup> It is this peculiar avoidance of the interrelationship between plain statements in Scripture and facts of science that separates Cosmonomic thought from Creationism.

Recent publications from Amsterdam (as noted above) indicate that members of the present Cosmonomic mainstream do not concern themselves with the implications of Dooyeweerd's non-evolutionary religious root in the sciences such as biology and geology. In a recent work, however, Hebden Taylor shows those high ideals being realized since he is a follower of Dooyeweerd who is at the same time a strict Biblical Creationist.<sup>8</sup> This book —*Evolution and the Reformation of Biology*— was recently reviewed by Rousas J. Rushdoony (See *Creation Research Society Quarterly*, 7(3):166 and 167. December, 1970).

Hebden Taylor focuses on a recent discovery in the field of embryology. The genes share the status of "cell code" with what is really a more basic informational system furnished by the egg cortex or cytoplasm. By use of quotations from DeWit it is shown that this thesis (developed by Raven and Waddington) invalidates the evolutionary viewpoint and corroborates that of Dooyeweerd. In other words, Taylor uses the priority and supremacy of cytoplasmic to genetic informational code as vindication of Dooyeweerd over the evolutionary view.

It is hoped that Taylor and other writers of his persuasion will develop a fuller synthesis of

Dooyeweerd's non-evolutionary religious root and a true Biblical Creationism. It is possible that the Cosmonomic philosophy could provide the well-orbed view essential to a consistent Creationism. It is likewise possible that Creationism is what Dooyeweerd should have been seeking all this time in the arena of natural science.

(Author's Note: Just before this article went to press, I was pleasantly surprised by a new work which will implement the hopes expressed. It is a 60-page syllabus entitled, "The Unmasking of Evolutionary Thought." The author, Arthur J. Jones, is a graduate student in zoology in Birmingham University. Excerpts from this syllabus have appeared as articles in the magazine, *Christian Graduate*, of the British Intervarsity Fellowship.

There is room here for only a rapid survey but one's impulse is to say of Jones that he is a genius—combining thorough scientific knowledge with sophistication in the field of philosophy. In crisp, business-like English, he has expressed Dooyeweerd's tremendous proposition of a Christ-centered Archimedean viewpoint with respect to the entire spectrum of theoretical thought.

Mr. Jones widens Hebden Taylor's study of the living cell. In plain English he is able to express the basic conceptual framework whereby the creationist can challenge the evolutionist at any point in science. He presents a thoroughly Christian view of origins study, demonstrating that such a "conceptual framework" is more adequate in many ways than the conceptual framework of evolutionism: This fine work is distributed privately by Mr. Jones whose address is: 7 Pakenham Road, Edgbaston, Birmingham B15 2NE, England, United Kingdom.)

### References

- <sup>1</sup>Dooyeweerd, Herman. 1958. The new critique of theoretical thought. Presbyterian and Reformed Publishing Co., Philadelphia, Pa. 3 vol. plus index.
- <sup>2</sup>Simpson, George Gaylord. 1967. The crisis in biology, *The American Scholar*, Summer Edition: 307.
- <sup>3</sup>Taylor, Hebden. 1967. Evolution and the reformation of biology. Craig Press, Nutley, N. J.
- <sup>4</sup>Lever, Jan. 1958. Creation and evolution. Grand Rapids International Publications; Kregel's, Grand Rapids, Michigan.
- <sup>5</sup>Van de Fliert, J. R. 1969. Fundamentalism and the fundamentals of geology, *Journal of the American Scientific Affiliation*, 21(3):69-81.
- <sup>6</sup>Dr. Dooyeweerd writes me that a limited edition of his "Creation and Evolution" translated into English is in the keeping of a Professor in Australia whose name and address can be secured from the Institute for Christian Studies at 141 Lyndhurst Ave., Toronto, Canada. This work is quite thoroughly discussed in the booklet, *Bavinck the Theologian* by Cornelius Van Til (Baker Book House, Grand Rapids, Michigan, 1961). It is apparently a commentary on the Lever work of the same name.
- <sup>7</sup>De Wit, J. J. Duyvené. 1964. A new critique of the transformist principle in evolutionary biology, *Philosophia Reformata*, 29:43-44.
- <sup>8</sup>Taylor, Hedben, *Op. Cit.*

## UNIVERSITIES AND COLLEGES HAVING THE CREATIONIST POINT OF VIEW:

### GRACE COLLEGE\*

Grace College is located on a 65 acre campus in Winona Lake, Indiana. It is situated near the center of a triangle formed by Chicago, Detroit and Indianapolis, and is in a county containing 100 natural lakes. The town of Winona Lake is widely known as the headquarters of several denominational and independent mission boards and agencies. In the fall of 1968, Grace College and Seminary assumed leadership and financial responsibility for the Winona Lake Christian Assembly, famous as the largest interdenominational Bible Conference grounds in the world.

Grace College is affiliated with the National Fellowship of Brethren Churches, being established in 1948 as a collegiate division of Grace Theological Seminary, under the leadership of Dr. Alva J. McClain, and Dr. Herman A. Hoyt, the present President. The full baccalaureate college curriculum was provided beginning in 1954, with over 1400 graduates since that time taking their places in the fields of teaching, Christian education, missionary and church work.

Present enrollment of 613 students includes those working toward the Bachelor of Arts, Bachelor of Music in Education, Bachelor of Science in Elementary Education, Bachelor of Science in Physical Education, and Bachelor of Science in Nursing. Eighteen majors and twenty-three minors are provided, including those leading to teacher certification in elementary education, English, mathematics, social studies, music and physical education.

Grace College has been granted annual accreditation by the Indiana State Department of Education since 1955. Graduates have been accepted for graduate study within the state at Indiana University, Ball State University, Butler University, Purdue University, St. Francis College and at graduate schools in other states outside Indiana.

The campus contains buildings for classrooms and laboratories, dormitories, gymnasium and the library-learning center, completed in 1969.

Basic cost for a full-time dormitory student is \$1,078 per semester, including tuition, board and room, and miscellaneous fees. Student aid in the form of scholarships and grants, loans, and school employment is available. The communities of Warsaw and Winona Lake provide a widely diversified economic climate, enabling many Grace College students to earn a portion of their college expenses through part-time employment.

The curriculum is divided into four divisions: Humanities, Social Sciences, Fine Arts and Natu-



**Figure 1. The Library-Learning Center, completed in 1969, at Grace College, Winona Lake, Indiana.**

ral Sciences. The Natural Science Division includes three departments: Mathematics, Biological Science and Physical Science. A special attempt has been made to offer a strong and modern mathematics program, including a forty-hour teaching major. Offerings in the sciences are being strengthened, and include at the present time minors in biology and chemistry and a major in general science. Courses are provided for the Bachelor of Science in Nursing program. Science laboratories are housed in Philathea Hall.

The Covenant of Faith which must be signed annually by each member of the faculty includes the following: "We believe in the Creation and Fall of Man: that he was the direct creation of God, spirit and soul and body, not in any sense the product of an animal ancestry, but made in the divine image (Gen. 1:26-28; 2:7, 18-24; Matt. 19:4; I Thess. 5:23)."

Chairman of the Natural Science Division is Dr. Jesse D. Humberd who holds degrees from Bryan College, Wittenberg University, Grace Theological Seminary, and the M.A. and Ph.D. in Mathematics and Science Education from Ohio State University. He has taught at Ohio State University, Wittenberg University and for five years in public school in Ohio.

There are four other full-time members of the Division: Vilas Deane, assistant professor of

\*This article is one of a series fostered by Dr. Walter E. Lammerts. This paper was prepared by Mr. Messner, Director of Development, Grace College.

mathematics has the M.Sc. degree from Ohio State University, and taught six years in public school before joining the Grace faculty in 1967. Richard Dilling, assistant professor of mathematics and physical science, has the M.S. in physics from Purdue University, and taught two years in public school. He has done additional graduate work at Wesleyan University in low-temperature physics. Daniel Wonderly, assistant professor of biology, holds the MS. degree in zoology from Ohio University and the Th.M. from Central Baptist Seminary. He has also completed National Science Foundation Summer Institutes in Radiation Biology, Molecular Biology, Parasitology and Comparative Anatomy. He taught zoology for 5 years at Wingate College before coming to Grace College in 1966. Lowell Miller, instructor in chemistry, joined the faculty in the fall of 1970 after having spent three years as a clinical chemist. His work involved developing new tests to aid in diagnosing leukemias.

In addition to the above, the full-time faculty is regularly augmented by part-time instructors and teaching fellows, sometimes chosen from the student body of Grace Theological Seminary. At the present time, Dr. Jonathan Leech is a part-time instructor in mathematics, holding a Ph.D. in mathematics from UCLA. Also assisting in



Figure 2. Candid view of Grace College science student preparing laboratory experiment.

mathematics as a part-time instructor is Mrs. Ethel Anderson who holds a master's degree.

The close association between Grace Theological Seminary and Grace College is evidenced by the theological preparation of the college faculty, many of whom have added some seminary work to their academic programs.

## NEW PUBLICATIONS

(Continued from Page 221)

skepticism. He did more than that, since he attempted to construct what seemed then, *and still seems to some people, an acceptable alternative.* (p. x) (Emphasis added, N. B. John Keosian, G. A. Kerkut, Loris S. Russell, J. R. Nursall, E. C. Olson, Charles A. Reed, A. S. Romer—G. G. Simpson debate, and Peter P. Vaughn—Editors).

The phenomenon of polyphyletic origin of major *as well as* minor taxonomic groups from two or more ancestral sources is illustrated by *many examples.* (Emphases added) (p. viii)

Berg was one of the outstanding intellects among Russian scientists. The breadth of his interests and the depth as well as the amplitude of his scholarship were remarkable. He had the reputation of being a "walking library," because of the amount of information he could produce from his memory. (p. xi)

\* \* \*

*The Flood Reconsidered* by Fredk. A. Filby, Ph.D. in History of Science. Pickering & Inglis Ltd., London, 1970.

Writing under the sub-title, "A review of the evidences of geology, archaeology, ancient litera-

ture and the Bible," the author, a chemist, has shown "that the Biblical account is an extremely ancient, very detailed and reliable account of the experiences of one man who, with his family, alone escaped from a vast flood . . ." (p. vii-viii) Based on 30 years of study of ancient chronology, Dr. Filby feels compelled to leave a wide margin in the date of the Flood. With regard to extent of the Flood, he writes,

Some time after the end of the Ice Age, and before the rise of the great dynasties, a great flood, caused either by the close approach of some heavenly body, or by the movement of the continents, or both, swept from the Atlantic, the Mediterranean, and the Indian Oceans over much of Europe and Asia to Alaska *and even beyond.* (Emphasis added) (pp. 31 and 32)

The following appears in the Foreword by Stephen S. Short:

It is a valuable work in three respects, firstly in that it furnishes ample evidence, from many sources, of the historicity of the deluge in the time of Noah, secondly in that it provides an enlightening exposition of the Bible's account of this event, and thirdly in that it draws attention to the significance of the story for the present generation. (p. ix)

## COMMENTS ON SCIENTIFIC NEWS AND VIEWS

HAROLD ARMSTRONG\*

### DNA Synthesis and Membrane Structure

DNA continues to be in the news. Some evidence has been found which seems to show that the view that has been widely held of how DNA acts is at least an over-simplification.<sup>1,2</sup>

For a while, and especially since Kornberg's work, it has been thought that the polymerase played a very important part in the replication of DNA. Now, however, the balance of evidence is swinging the other way, and it is suggested that: "... there is a growing disbelief that DNA polymerase ... has any relevance whatsoever to the question of how the cells copy out the DNA. ..."

Moreover, the artificial growth of DNA may not prove as much as it has been alleged to do, for: "... no one has ever persuaded DNA polymerase to synthesize in the test tube a double helix of DNA; Kornberg's success was achieved with a rather unusual single-stranded DNA."

It is then suggested that the replication may take place on the membranes, in actual bacterial cells. Evidence to support such a view was found.<sup>3-5</sup> In certain experiments, "... DNA is synthesized ... at rates of chain growth comparable with replication in vivo. This DNA synthesis is also observed with a strain of *E. coli* which lacks DNA polymerase activity in vitro."

When the actual mechanism is considered, the experiments seem to raise more questions than they answer, for, "... it has not yet been shown that both DNA strands are synthesized in this system or that DNA synthesis really occurs on double-stranded DNA." Indeed, "Because DNA synthesis is also observed in sheared bacterial lysates neither integrity of the bacterial chromosome nor an active swivel mechanism of the kind postulated for the replication can be necessary for this kind of DNA synthesis."

Also, more evidence was found to show that the membranes or walls have something to do with the matter. "The only DNA synthesizing activity left in a bacterial mutant lacking DNA polymerase is associated with the cell membrane." Thus it seems that,

... much of the DNA replicating machinery is ... associated with the cell membrane ... there are at least two functionally different DNA polymerizing activities in the bacterial cell; the "classical" DNA polymerase and a membrane-bound "DNA replicase" which may or may not contain the DNA polymerase as an active component.

It would seem that there are two comments especially to our point here. In the first place, if the replication is always or usually associated with walls or membranes, this must make a difficulty for the theories of how life arose spontaneously. For it is hard enough to believe that replicating molecules arose thus; if the replication requires that membranes already exist a spontaneous origin is beyond all belief. In other words, the system of life could not have come about gradually; it had to exist in some complexity in order to exist at all.

In the second place, one recalls the old theories of valence, according to which atoms were thought of as having one, two, or whatever it might be "valence hooks" on them. (We need not ask now how seriously the old chemists really believed this.) Anyway, such a theory, of course, proved to be much too mechanical. It is not likely that the mechanical theories of the replication of DNA will be found to have the same fault?

Finally, for me, anyway, the really main difficulty still remains: I have never found any convincing explanation of how a certain structure of DNA could bring about the pattern of a peacocks tail, or the structure of a fly's eye.

### DNA and Unsolved Problems

Common opinion in genetics seems to be that inheritance depends on genes, which, in turn, depend on the molecular structure of DNA, and on the way in which one of those molecules can serve as a template to make another molecule. It should be noticed, though, that this, in effect, explains how bricks are made, but not how they are put together to build a house. Or else, it supposes that in or on each brick there is a blueprint for the house. The question, who or what reads the blueprint, and how, is not raised, let alone answered.

There is some evidence now that the genes and chromosomes are not the invariable, mechanistic things they sometimes are taken to be.<sup>6-8</sup> It appears that there is some rearrangement of DNA in the cells. One case in which this happens has to do with antibodies, and it is suggested that the possibility of rearrangement may make possible the great amount of variability which, in fact occurs.

Are we to conclude from this that the DNA corresponds, not so much to an utterly mechanistic thing, like the cams of an automatic screw machine, but rather to a blueprint, read by an intelligent worker? For the most part he will follow the blueprint, but, should the need arise,

\*Harold Armstrong is a faculty member of the Queen's University, Kingston, Ontario, Canada. He holds the Masters of Science Degree.

he will change things around, and improvise. And that seems to be, in effect, what happens in the cases mentioned.

### Is Convergence Credible?

Recently F. B. Salisbury<sup>9</sup> has raised the question whether accepted views in genetics and the notion of natural selection are not incompatible. (His article was mentioned in this column, June, 1970, p. 79-80.) His views seem to have been criticized, but never refuted. Now he has obtained some support.<sup>10</sup> A recent note asks, among other things "... if the eye, for example represents only one of about  $10^{1,000,000}$  possible forms that could have done as well, why is it that the invertebrate and vertebrate eyes, which are supposed to have been developed independently, seem to be so much alike?" After some more discussion, it is decided that: "... Salisbury's conclusion still seems to stand: the concept of evolution by random mutation and natural selection and the concept of the uniqueness of the gene are apparently contradictory. . . ."

It is exceedingly unlikely that unrelated creatures would develop similar features by convergent or allegedly parallel evolution. Dr. A. Custance touched on this matter at the Bible-Science Seminar at Hamilton, Ontario, Canada, 30 May 1970; and pointed out that similar needs and purposes often lead to similar features. Such considerations would seem to say that the final cause, so much scorned by many nowadays, has actually a very important influence on creatures, and that we should do well to take such final cause into account.

(Editor's Note: Readers might like to obtain a 34-page treatment of parallel changes in organisms by Dr. Arthur C. Custace, "Convergence and the Origin of Man," Doorway Paper No. 7, Box 291, Brockville, Ontario, Canada. \$1.00.)

### Human Skull Morphology Variable

Of the various alleged "missing links" much has been made of jaw bones and teeth. (Sometimes perforce, because nothing else was found!) They were supposed to show whether the late owner had been a man, an ape, or something in between. However, some recent investigations show that similar differences can be found among different kinds of apes, all of which are living today, and which thus are presumably not in any line of descent.<sup>11</sup>

The studies were on three kinds of gorilla living in Africa: the mountain, eastern lowland, and western lowland gorilla. There were systematic differences in the skull, teeth, etc., and these were ascribed, at least partly, to differences in diet. It is pointed out that some of these differences are rather like peculiarities associated with the fossil ape, *Gigantopithecus*.

At the Bible Science Seminar held at Hamilton,

Ontario, Canada, 30 May 1970, Dr. A. Custance suggested that many differences in the skulls of fossil men, supposed to have to do with descent, are rather due merely to diet and way of life. As I understand it, this was not meant in any Lamarckian sense; the point was just that a man who ate tough food from childhood, e.g., would likely grow up having well-developed jaws, jaw muscles, and (which can affect other parts of the skull) places where the muscles are attached. Thus small differences in skull must be very shaky evidence indeed on which to assign different apes, men, or other forms their roosting-place in the "evolutionary tree." (See note at end of previous item.)

### Plant Poisons Should Puzzle Evolutionists

Recently my daughter had an encounter with poison ivy, or thought that she had done so. It turned out not to be at all serious, but it set me thinking. How are the poisonous features of such plants to be explained by the usual evolutionary theory?

Not only is it true, as it is of almost every other peculiarity, that the mere beginning would give the plant no advantage worth mentioning, but it is hard to see the fully developed poisonous property is of any real advantage. Oh, it may keep animals from grazing on the poison ivy, perhaps, but it is not clear just how that would be an advantage; being grazed might well be advantageous in helping to spread seeds.

The same kind of thing might be said about plants that have poisonous seeds and berries.

It would seem, then, that evolutionists have no real explanation of poisons in plants. This leaves the field open to creationists. Have the poisons something to do with the fall of man and the subsequent curse on the ground? Maybe some readers would like to do a little thinking about this matter.

### Neanderthal Had Rickets

About 1872, the famous biologist Virchow suggested that the peculiarities of the Neanderthal man indicated, not some special place in the chain of evolution, but rather a bad case of rickets. Apparently he was either ignored or shouted down; those who were determined to have evolution were determined to have evidence for it, and were not going to accept a simple explanation when an evolutionary one could be contrived. Now the question has been re-opened, and it is concluded that the explanation of rickets is very likely the true one.<sup>12</sup>

As other diluvial hominids of the same type turned up in Belgium and France and the day was carried for Darwinism, however, Virchow's carefully argued and factual diagnosis concerning the earlier finds be-

came discredited—by association, if never objectively. But the growth of knowledge since, anthropological as well as medical, suggests that Virchow's view may have been essentially correct. (p. 577)

The author presents a discussion of paleoclimatology, proposing that Neanderthal's diet, living habits, and environment may have predisposed him to rickets which is now known to result from a deficiency of vitamin D:

The cold itself contributed further to the reduced availability of ultraviolet by driving Neanderthal out of the open to seek shelter in caves or tents, and perhaps to the wearing of thick furs. It has also been suggested that Neanderthal had little access to dietary vitamin D, because his basic hunter's food list, relatively adequate in terms of calories, protein, calcium and phosphorus and vitamin B, included only negligible amounts of fatty fish and eggs. (p. 578)

Dr. Ivanhoe has personally examined many skulls of Neanderthal children and concludes, "... the crucial point which has not been emphasized is that every Neanderthal child skull studied so far shows signs compatible with severe rickets." (p. 578)

He proposes further that this hypothesis may be tested by direct microscopic examination of teeth for "interglobular spaces in the dentine" and by use of X-ray diffraction to reveal possible presence of "rachitic matrix" in the bones. He indicates that preliminary studies confirm this opinion: "Sognnaes, using a small sample from lower latitude Würm I and the following interstadial, has demonstrated that the teeth provide unequivocal evidence of serious vitamin D deficiency in Neanderthal man; similarly, Baud *et al.*" (p. 578)

The possibility that the fossil men might have been different, not because of evolution, but rather because of disease, has, of course, been suggested many times by Creationists. Perhaps Creationists should not say: "We told you so!"; but I will: —we told you so!

Incidentally, if it is true that the Neanderthal man lived in a quite cloudy climate, might considerations of the time at which he lived, from a Creationist viewpoint, lead to some thoughts about ancient weather, and, perhaps, thus to something about conditions before and after the flood?

### Human Dispersion

Few people would deny that ancestors of the American Indians came from the Old World. While it is assumed commonly that they came by way of Siberia and Alaska a few thousand years ago, there is evidence that there was at

least contact between the two Worlds, across the Atlantic, within the first thousand years B.C. or thereabouts.

Some of this evidence has been collected and set forth.<sup>13</sup> It includes such things as an inscription, said to have been found in Brazil, reporting the landing of a Phoenician ship's crew there about 500 B.C.; and carvings and ceremonies of the Yushi Indians, of Georgia, which seem to be related to the practices of the Canaanites, or even of the Hebrews. And various other pieces of evidence are mentioned.

If it is true that men from the Old World reached the New across the Atlantic, that raises the possibility that the New World was peopled thus. One landing of not so many people in a ship would have sufficed; consider the example of Pitcairn Island. Of course, they could have come both eastward and westward, but one is inclined to apply Ockham's razor here.

The view, that the races of men have all spread out from somewhere in or near Asia Minor within the last few thousand years fits in, of course, with the Biblical account of the flood and the subsequent repopulation of the Earth. If, on the other hand, there had been men of some kind around for nearly a million years, as evolutionary theorists wish to have it, then it seems incredible that they should have remained mostly in one place for ages, and then, within a few thousand years, spread over all of the Earth.

In connection with the (possible) Hebrew connections, might a speculation be made? It is said that, when the Spanish came to Mexico, the Indians were expecting, according to a legend, a white leader to come. Could this, on their part, have been a garbled version of the prophecy of the Messiah?

### Evolution and Animal Adaptations

It appears that last summer the 17-year locusts, *Magicicada septendecim*, were especially plentiful around Washington.<sup>14</sup> A note admits that these insects are difficult for evolutionists; the author remarks: "... evolutionary purpose of its life cycle is far from understood." It is suggested that maybe its sudden appearance, after years of absence, takes potential predators by surprise.

But surely the predators would have learned from other broods to eat the insects. Besides, were this the true reason, the time spent underground might be expected to be just a little more than the lifetime of the most important possible predators: surely rather less than seventeen years.

Actually, if evolution is supposed to explain all of the features of all animals (not to mention plants!), it obviously has failed, and must continue to fail. Consider the common rabbit and

ground hog, animals whose ways of life are quite similar. The rabbit's ears are large, the ground hog's small. Can any possible reason, in terms of evolution or natural selection, be given for the difference? And thousands of other such examples could be mentioned.

But if evolution cannot provide the explanation, one must appeal either to design or to chance. If it is necessary to admit design, and thus a Designer, why not apply Ockham's razor, and admit that all, or most, features are to be explained thus? This is what the Creationist does.

As for chance, an appeal to it is not an explanation at all; it is a refusal to give an explanation. If one says that a die turned up six by chance, he had better not know why. If he knew why, it would not have been by chance; the die would have been loaded, or something of the sort.

Is the fact not that evolution and selection continue to get a hearing only by concentrating on a few trivial or superficial matters, and having nothing to say about the important differences between creatures?

#### **Which First: Bird or Egg?**

Readers will likely have heard reports of the threat to pelicans along certain coasts. Apparently the fish which they eat have taken in appreciable amounts of DDT, which, having been used in agriculture, is washed into the ocean. The DDT interferes with the formation of proper shells on the pelicans' eggs. The shells are weak, and the eggs are mostly broken before they can hatch.

Of course, we regret that this has happened. But we can draw from it an argument.

Reptiles lay eggs which are covered by a tough skin. Birds eggs, for the most part anyway, have a delicate skin and over that a shell. If birds evolved from reptiles, how did the transition from one kind of egg to the other take place? If the alleged reptile on the way to becoming a bird laid an egg with a tough skin, what advantage would a thin and rudimentary shell have been? If the skin was thin, and the shell rudimentary, the eggs would never have survived to hatch.

This is another one of the many cases in which a transition could not have been made little by little, but would have to be made all at once. But if anyone seriously proposes that "once a reptile laid an egg from which a bird hatched," it is necessary to raise again the question: "With what did the bird mate?"

As far as I know, there is no fossil evidence here. I do not know that any fossil bird's eggs have ever been found; and in particular, as far as I know, there are none for the supposed earliest birds. (Comment by readers will be appreciated.)

On the other hand, fossil eggs of reptiles, especially dinosaurs, seem to be fairly common. Is this not what would be expected if the fossils date from a catastrophe, viz: the flood? For just from the kind of place in which they lay their eggs we should expect that reptiles' eggs might be buried, (or buried deeper), and preserved, but birds' eggs would likely be dashed about and destroyed.

#### **Design in Bird Flight**

The flight of birds has always excited much interest and admiration. Some recent studies, in which an Indian falcon was trained to fly in a wind tunnel, have given some new information about the aerodynamics of the flight.<sup>15</sup> One thing that comes out is that the birds adjust their wing span to change the ratio of lift to drag in order to suit their speed. It is interesting to consider that the birds have been doing this for thousands of years, while the closest that we can come to it in aeroplanes is the rather crude expedient of wing flaps.

#### **Cyclamates Are Unnatural**

Since everyone knows about the recent furor about the use of cyclamates, among other things, in food, it is not necessary to give a specific reference to it. But it may be worthwhile to try to learn a lesson from what is happening.

First of all, those of us who have the appropriate skill in chemistry, dietetics, etc., would do well to try to learn the facts, and to share our knowledge. It is generally considered that to heal the sick is a good work; if, then, prevention is better than a cure it is a better work to help people to avoid sickness, and if proper diet will do that, then instruction in proper diet is a good work.

It is worth noticing that difficulties arise chiefly from attempts to improve on nature. A person in good health may fatten on natural food, but there seem to be no other bad effects. We might recall Aristotle's saying, that if one way is better than another, the better way is the way of nature; and Sherlock Holmes' (toward the end of the "Case of the Creeping Man") maintained that if we try to rise above nature we are liable to sink beneath it.

In saying all this, one is not turning pantheist. We believe that God made the world to be inhabited, and put in it many things for our use. We are likely to do better by applying God's ways than by going against them. In saying, e.g., that Shakespeare's plays are standards of drama which one does well to follow, one is not confusing Shakespeare with his work.

It is worth noticing that the reason for cyclamates is to have some of the effects of eating, taste and so on, without eating at all, as far as nutrition is concerned. When the matter is stated

in this way, many philosophers, whether Christian or not, might say that there seems something not quite right about such an attempt. It seems somehow akin to eating far beyond necessity, i.e., to gluttony. And gluttony, of course, has always been condemned by Christians (and not a few other moralists). Here is another case in which a view, adopted by earlier Christians on general and Christian principles, turns out to have other reasons of which our ancestors never dreamed.

Incidentally, might a similar thing not be said about the recent considerations of the possible effects of smoking? Generally, the view of the church has been that smoking, while perhaps neither sinful or even very harmful, is a thing that one is better off without. Yet few could have given any very definite reason for such a view.

Is it not likely that the Holy Spirit has guided the general opinion of the church in these matters, to lead it into the truth, even though it does not quite appear how the guiding is being done? After all, Caiaphas, who was no worthier than most members of the church, had such guidance<sup>16</sup>; may it not happen often?

This is not to deny that the establishment or hierarchy of the church may be wrong on a given matter, nor even that most of the (apparent) church may be wrong when the great apostasy is under way. But God has not left Himself without witnesses in the past, nor will He do so utterly in the future. And the witnesses may have a testimony on a surprising variety of matters.

Another reason, it is often said, for the use of "foodless foods" is that many people have so little physical activity. Is such a state of affairs also contrary to nature, i.e., to God's plan? When God said: ". . . six days shalt thou labour . . ." is it not likely that He meant just that?

Finally, there is food for the body and food for the mind. Many of us, who teach in some way or another, are concerned with the latter. Are there "cyclamates" also among mental food? Surely there are; they would include anything that gives the impression of nourishing the mind without the reality. Often these will "taste good", i.e., seem attractive; but things that seem good are not necessarily so.<sup>17</sup>

Indeed, one could argue that, in matters of teaching and learning, that which seems especially attractive must be suspect, for: ". . . no chastening for the present seemeth to be joyous . . .".<sup>18</sup> (The Greek word translated "chastening" could as well be rendered "training" or "education".) So we are told that the students find the course of studies fun (as if the main reason for going to school were to have fun!); what we are not told, and can not see, is how they are any better off when it is finished.

We can see the "foodless food" aspect at its worst in some parts of the "new mathematics", where the pupils learn words and parrot definitions, without any notion of what it is all about, let alone what use, if any, it may be.

The "unnatural" aspects show up in the sciences, e.g. biology that is more concerned with DNA than with what animals and plants are actually like, or physics which leaves the students thinking that they know all about light waves, but without any notion of what is actually meant by saying that there are so many calories in a piece of cake.

In all these things, we should decide what is really good food for the mind, i.e., what is really worth knowing, and then do our best to help students to get to know it.

### Pollution and Evolution

Somewhat related, perhaps, to the matter of harmful or overly-artificial foodstuffs is that of pollution, and it is even more in the news nowadays.

It is worth noticing that the Bible has something to say on this matter. The disposal of sewage, for instance, is mentioned.<sup>19</sup> It may be that the exact method given there does not apply now, but the principle, that of putting the material where it can do no harm, surely does.

It is easy to notice that some (but not all), of those who are most worried about pollution, or about the effects of unsuitable foodstuffs, are ardent evolutionists. Is there not a strange inconsistency here? For evolution is supposed to have come about because creatures found their environment unsuitable, and the result is considered to be improvement, i.e., to be good.

So it would seem, according to such principles, that the more unsuitable the environment is, the better. But the evolutionist is strangely reluctant to draw such a conclusion. Is the truth that, in this matter, his heart is better than his head, as the saying is? Or is this another of the cases in which men are quite ready to reach a conclusion in spinning out theories, but their common sense prevents them from putting the theories into practice?

Creationists, on the other hand, know that all creatures are worked into the master plan by the Master Planner; and that the chances of improving things by tampering are about as great as those of improving the running of a watch by throwing sand into the works.

### Biological Education: Nuffield Courses

Many Christians have objected to the BSSC biology books for the schools, on the grounds that they contain much propaganda for evolution, and thus, whether intentionally or not, contain what amounts to attacks on Christianity.

Also there have been other objections to such series of books, objections having nothing to do with Christianity, but concerned with the purpose of biology and with the methods of teaching. Readers who have been concerned with the BSSC books might be interested in things that have been said about similar attempts elsewhere.

In Britain the various Nuffield courses correspond to the BSSC, etc., and they have had wide publicity. Now some complaints about the biology course have appeared.<sup>20</sup> Briefly, the letter cited maintains that the Nuffield scheme is inflexible, that it is in danger of becoming a party line which might be a substitute for real work on the teacher's part, and that it is really intended for only the very brightest students.

The emphasis on "learning by discovery" it is maintained, is mistaken pedagogy, if it is not entirely sham. There is a tendency to concentrate on matters of academic interest, and to ignore the everyday matters which are the things of real concern to most people. In some cases the equipment, methods, or both, are extravagant.

Finally, the Nuffield scheme, it is said, has led, either by intention or by accident, to examinations of the "true-false" or similar types, which, the writer urges, are really intelligence tests.

The writer does not object to the inclusion of evolution; indeed, he commends it. Nevertheless, it is interesting to see that, even if that be accepted, other serious objections arise. Maybe the truth is (although many will not admit it), that what is not good from the viewpoint of Christianity will prove not to be good from any other viewpoint either.

### Greenhouse Effect on Venus

The phenomenon of the greenhouse effect has been of much interest to creationists, for the greenhouse which supposedly caused the mild, uniform, climate in the past, for which there is much evidence, may well have been the canopy which provided the water for the flood. Recently the greenhouse effect has become of interest to others, for some are coming to believe that it is acting very powerfully on Venus. Two articles on the matter may be of interest.<sup>21,22</sup>

The one in *Icarus* inquires whether the greenhouse effect is, in fact, adequate to account for the observed high temperatures on Venus. The answer is yes; and in the course of the investigation other interesting things are mentioned.

A planet receives energy from the Sun, in great amount if near the Sun. The amount received depends also on the planet's albedo, its reflecting power. It also re-radiates energy, the amount increasing with the (average, of course), temperature of the planet. Thus the planet comes to a temperature at which the amount of energy radi-

ated is equal to that received. The greenhouse effect, to put it in the simplest way, makes the planet radiate less at a given temperature; hence it comes to equilibrium at a higher temperature.

From their distances from the Sun, and their albedos, (which can be determined from observations), it is calculated that, in the absence of any greenhouse effect at all, the average temperatures of Venus, Earth, and Mars would be, respectively, about -30°C, -20°C, and -65°C. The surprisingly low figures for Venus is because of the high albedo; much energy is reflected immediately instead of being absorbed and re-radiated.

The greenhouse effect is present to some extent in all the cases, and raises the surface temperatures by about 630°C, 35°C, and 7°C, respectively, to give average surface temperatures of about 600°C, 15°C, and -58°C. It appears that, on Venus, the greenhouse effect is due to both water vapour and carbon dioxide, and that both are needed to make an extremely effective greenhouse.

While the greenhouse effect on the Earth seems very little compared with that on Venus, it is worth noticing that it is vital, if the Earth is to be the home of living beings. An average temperature of 35°C lower would just about spoil the Earth for its purpose. Here is another piece of evidence to show how carefully designed the Earth is, and how delicately balanced conditions are.

Could these considerations give us a suggestion of what happened during the flood? Is it possible that, toward the end of the flood, the canopy having vanished and the present system not yet having been established, the greenhouse effect disappeared completely for a while? The cooling of the air, along with much evaporation from the still relatively warm water, could have caused much snow at the higher latitudes. This might account for the ice age, the frozen mammoths, etc. Later things settled down with a greenhouse effect of about the present amount, and the climates became more or less what we know today.

Another possible cause of the former uniform temperatures on the Earth might be mentioned here. It might be that, before the flood, the distribution of water on the surface being different, there was much more transport of heat by the circulation of water; there were, in effect, many Gulf Streams. The flood, of course, would have spoiled all that.

The article in *Nature* is evolutionary. The authors assume that Venus, Earth, and Mars, started out similarly, with little atmosphere, and that water vapor and gases were released from the interior. On Venus, the higher initial temperature (the albedo presumably was not so

great then) caused the vapor and gas to remain in that form; the resulting dense atmosphere, providing an effective greenhouse, caused the temperature to go yet higher, and the process ran away. On Earth, at a lower initial temperature, the water vapor condensed, and the carbon dioxide went into carbonates, etc. Thus the greenhouse effect, and the temperature, remained moderate. Mars, perhaps, never had much atmosphere at all.

It is suggested that, were the Earth only about five million miles closer to the Sun, it, too, might have had a runaway. This may not mean that, were it now to move that much closer, such a thing would happen, for the (hypothetical) initial stages are supposed already to have transpired.

It does show, though, another example of the incredibly lucky beginning which the evolutionary theory has to assume because a difference of five per cent in the size of the Earth's orbit might have been crucial. From our viewpoint it is rather an example of the fine planning that went into the design of the Earth as a place "to be inhabited".

While we shall not, then, accept the evolutionary story from this second article, there may be some use in it in thinking about the greenhouse effect, and for the reasons just mentioned.

#### **Greenhouse Effect on Venus Continued**

Some recent studies of Venus may be of some interest. These were carried out by the analysis of microwaves, of wavelength 11.1 cm., emitted by the planet as part of its thermal radiation.<sup>23</sup> They are said to come mainly from the surface, not from the atmosphere or the clouds. The analysis of the microwaves makes it possible to estimate the temperature at different places on the planet.

It is stated that the difference in temperature between the equator and the poles is very small, at most maybe 12°C. Winds, it is suggested, might have something to do with the equalizing of temperatures. However, it is not likely that the greenhouse effect is very important here? If so, this is of interest, for many believe that the greenhouse effect of the canopy, which the Earth may have had before the flood, similarly equalized the temperatures. So here is evidence which suggests that such a thing works.

Incidentally, it is mentioned that the sunset edge of the planet seems to be warmer than the dawn edge. This, of course, is what one would expect.

#### **Meteoric Ice and Noah's Flood**

A report on studies of small meteors, those which are too small to reach the ground, has some interesting points for creationists. Observa-

tions included some by photography, some by radar.<sup>24</sup> The conclusions will surprise those of us who had always supposed that meteors were little pieces of rock, or maybe of iron.

In fact the author concludes that most of the meteors are quite light, their density being maybe one-third that of water. It seems likely that they are very spongy; and they may consist, to a considerable extent, of ice, or possibly of other frozen gases, such as ammonia. This belief fits in with the observations that many meteors seem to be fragments of comets, and that comets likely consist of ice to a considerable extent.

One is led to wonder whether there may not be also larger meteorites of ice. It is said that few stone or iron fragments have been found where the huge meteorite struck in Siberia early in this century. A meteorite of ice, however, would cause much the same damage. When it struck, the heating would convert the ice into superheated steam, causing an enormous explosion. But thus the meteorite would be dissipated, and would leave few fragments.

This evidence would seem to make it appear possible that the water for the flood may have come from ice from outside the Earth, as, indeed, Patten has already suggested.<sup>25</sup> Such a source may not have been needed; the water in the canopy (for which there seems to be some independent evidence) may have been enough. But until we are quite sure of the details, it is worth our while to look into the various possibilities, and for this reason the possibility of meteoric ice will be of some interest.

#### **Earth Age and Rock Creep**

Everyone is familiar with the phenomenon of creep in soft materials, a weight, e.g., gradually sinking into a cake of wax on which it rests. Engineers have to consider the possibility of the same kind of thing even in metals, especially at high temperatures. It appears that even a brittle material, such as rock, may creep.<sup>26</sup>

The article cited is rather mathematical and theoretical, but it does seem to show that rocks may creep by quite large amounts.

Of course, the process is a slow one. But one may well wonder whether, if the rocks are untold millions of years old, they would not have crept out of all recognition. Of course, there are highly distorted strata, but there are others which seem to be much the same as when they were laid down, and that although they are in situations such that they are obviously under considerable stresses, and, moreover, under which the stresses vary much from place to place.

It may be that we have here something which can be developed into another argument for a young Earth.

### Fossils, Magnetism, and Position of Poles

Lately studies of the magnetization of suitable rocks have been used to try to establish the history of the Earth's magnetic field. When the field appears to have changed, this is associated with the notion of "wandering poles".

An attempt has been made to investigate the former position of the poles in another way.<sup>27</sup> Fossils, e.g. clams, from the Permian, have been investigated as to their kinds, variety, and distribution. The findings were compared with the information about similar creatures living today.

The two arrangements were very similar, which suggests that the climate at different places, and hence the position of the (geographical, at least) poles was similar then to what it is now. It would appear, then, that the poles have not wandered, nor the continents drifted. (Not north and south, anyway.)

The authors do not accept this conclusion, and propose, rather, that in Permian times the Earth's field was much different from what it is now, e.g., not axial.

This matter may be of interest to creationists, since nowadays attempts are made to deduce so many things from the magnetization of old rocks. Also, the information presented may show another flaw in the uniformitarian picture.

### Continental Drift in Early Writings

Continental drift seems to be accepted by many geologists nowadays, although it may be argued that the evidence is not as strong at all as it is often supposed to be. As for creationists, I suppose that we do not necessarily deny that continents might move around, but, if we believe in a recent creation, we might think that there has not been enough time for continents to go very far, if their motion was always very slow.

A recent article,<sup>28</sup> which recalls some older theories and suggestions which might be interpreted as continental drift, or at least as related to it, may be of some interest. Most of the discussions mentioned date from between 1600 and 1900. They involve mostly a catastrophic, not gradual, displacement of the continents. Some depend on Scriptural evidence, and, in particular, relate to the division of the Earth which happened in Peleg's time.

This article might well be worth some thought. For it often happens that an idea, which has been forgotten almost in the course of time, can be revived and re-applied. In any event, the article might provide some useful references.

### References

- <sup>1</sup>News item. 1970. Final twist to the Kornberg saga?, *New Scientist*, 46(703):412.
- <sup>2</sup>Chedd, G. 1970. Doubts about how DNA is copied, *New Scientist*, 46(703):426-427.
- <sup>3</sup>Smith, D. W., H. E. Schaller, and F. J. Bonhoeffer. 1970. DNA synthesis *in Vitro*, *Nature*, 226(5247):711-713.
- <sup>4</sup>Knippers, R. and W. Stratling. 1970. The DNA replicating capacity of isolated *E. coli* cell wall-membrane complexes, *Nature*, 226(5247):713-717.
- <sup>5</sup>News items and comments. 1970. *Nature*, 226(5247):685-687.
- <sup>6</sup>Terry, W. and J. Ohms. 1970. Implications of heavy chain disease protein sequence for multiple gene theories of immunoglobulin synthesis, *Proceedings of the National Academy of Sciences*, 66(2):558-563.
- <sup>7</sup>Golly, J. A. and G. M. Edelman. 1970. Somatic translocation of antibody genes, *Nature*, 227(5256):341-348.
- <sup>8</sup>*New Scientist*, 47(712):222. 1970.
- <sup>9</sup>Salisbury, F. B. 1969. Natural selection and the complexity of the gene, *Nature*, 224(5217):342 and 343, October 25.
- <sup>10</sup>Spetner, L. M. 1970. Natural selection versus gene uniqueness, *Nature*, 226(5249):948-949.
- <sup>11</sup>Groves, C. P. 1970. Gigantopithecus and the mountain gorilla, *Nature*, 226(5249):973-974.
- <sup>12</sup>Ivanhoe, Francis. 1970. Was Virchow right about Neanderthal?, *Nature*, 227(5258):577-579.
- <sup>13</sup>Lear, J. 1970. Ancient landings in America, *Saturday Review*, 18 July, p. 18.
- <sup>14</sup>*New Scientist*, 47(712):222. 1970.
- <sup>15</sup>*New Scientist*, 47(712):223. 1970.
- <sup>16</sup>St. John 11:49-52.
- <sup>17</sup>Proverbs 16:25.
- <sup>18</sup>Hebrews 12:11.
- <sup>19</sup>Deuteronomy 23:12-14.
- <sup>20</sup>Martin, P. G. 1970. The case against Nuffield O-level biology. *The School Science Review*. 51:914-917. (The O-ordinary-level in Britain corresponds to about the penultimate year of high school in the United States.)
- <sup>21</sup>Ohring, G. 1970. High surface temperature on Venus: evaluation of the greenhouse explanation, *Icarus*, 11(2):171-179.
- <sup>22</sup>Rasool, S. J. and C. de Bergh. 1970. The runaway greenhouse and the accumulation of CO<sub>2</sub> in the Venus atmosphere, *Nature*, 226(5250):1037-1039.
- <sup>23</sup>Sinclair, A. C. E., J. P. Basart, D. Buhl, W. A. Gale, and M. Liwshitz. 1970. Preliminary results of interferometric observations of Venus at 11.1-cm. wavelength, *Radio Science*, 5(2):347-354.
- <sup>24</sup>Verniani, F. 1970. Structure and fragmentation of meteoroids, *Space Science Reviews*, 10(2):230-261.
- <sup>25</sup>Patten, D. W. 1966. The Biblical flood and the ice epoch. Pacific Meridian Publishing Co., Seattle. See especially Chapter VI.
- <sup>26</sup>Cruden, D. M. 1970. A theory of brittle creep in rock under uniaxial compression, *Journal of Geophysical Research*, 75(17):3431-3442.
- <sup>27</sup>Stehi, F. G. 1970. A test of the earth's magnetic field during Permian times, *Journal of Geophysical Research*, 75(17):3325-3342.
- <sup>28</sup>Rupke, N. A. 1970. Continental drift before 1900, *Nature*, 227(5256):349-350.

## BOOK REVIEWS

*The Mythology of Science* by Rousas John Rushdoony. 1967. Presbyterian and Reformed Publishing Co., Box 185, Nutley, N. J. 07110. 134 pp., paperback, \$2.50.

Reviewed by George Bedigian.\*

Reverend Rushdoony has written numerous books on theo-social subjects, including, *The Messianic Character of American Education*, *The Biblical Philosophy of History*, and ten other titles. He lives in California, is of Armenian nationality; speaks at conferences and churches. He grew up as an evolutionist and attended a modernist seminary.

This book might well have been titled, "The Mythology of Evolution." The author is bold but not brash, assertive but not abusive, vindicating but not vindictive. He wields a well-tooled phrase.

**Meaning of myth.** Man resents history as too clearly showing judgement on human ills. So man sets up traditional interpretations of history, known as myths, to show it under human control. In a way this makes man play the role of God.

This embellishment of history relates more to science than to the Bible. To the extent that scientists stick to facts, it relates more to the Bible than to magic. But when scientists try to show that man is in control, it becomes subject to magic and myth. Thus scientists become the modern magicians; and a state imbued by the idea that man is in control, becomes totalitarian.

There have been myths in every age. These coincide with the current thought of that culture. Hence each age finds it difficult to spot the absurdities of its own myths. Charles Darwin gave "substance" to the current humanist supposition of progress, in his doctrine of evolution. Despite anything to the contrary, the supposition of progress was made to fit the facts of science and history. And the world, even the church, jumped on Darwin's bandwagon.

**Man's control, past and future.** This myth of progress and control by man is nothing new. It is really a throwback to Babel, pretension that man can see into the future and create a paradise without God. It also goes back to the religion of Baal, which recognized the existence of natural forces, while not necessarily worshipping them. This control drive is reflected in the present multiplied interest in astrology and other occult phenomena.

One goal of the myth of progress for man is, "power . . . to influence his own future evolution"

(quoted from George Gaylord Simpson), p. 12. Yet if everything progressed, why are there extinct species? (and why are there reverse mutations?).

Some eager evolutionists advocate, besides freedom from want and organ transplants, RNA transfer to transmit memories, and education using force to impart value-judgements to the pupils. They even attempt to create life. Tissue rejection seems to be a big hurdle to transplants. The tremendous thought and effort to create life is inconsistent with the evolutionists' theory that life came by chance or by itself.

**Evolution as religion** has its prophecies—what—ever glories the future holds. Evolution has its high priests—they sell evolution with revival fervor. Evolution has its standard of good and evil—it depends on whether any conduct has bad consequences on its participants. Evolution has its successes ". . . it fulfilled the basic requirement of any religion by subsuming all phenomena under one cause" (quoted from Jacques Barzun) p. 14. Evolution has its miracles:

a) Spontaneous generation. And this is the reason for the energetic search for extra-terrestrial life, ". . . to support our basic thesis that life is a spontaneously originating process" (quoted from J. H. Rush), p. 12.

b) Lamarck's doctrine of inheritance of acquired characteristics.

c) Time itself brought about changes. The stretching of time is a disguise. A thing that cannot happen by itself won't happen whether in 6 billion or 6 trillion years. There are so many traits needed for life that even evolutionary time is not enough for chance to operate.

**Science becomes a religion.** This happens when it is interpreted to show that nature does not have a design or purpose of God. The author goes to some length to show that this sort of science is opposed to God's truth. (Comment—Christians should be careful not to oppose science merely because an evolutionist places a wrong label upon it.) The author uses Rom. 1:20 as showing God's design and purpose.

**Creative Evolution Fallacy.** The trouble with creative evolution is that it transfers result from a creative act to a creative process. It is as if God had transferred His sovereignty to some inner powers of nature, thereby making God an alien to what He created. If this were so, then nature and Scripture would not equally reveal God's truths. Nature does not contradict the Bible, but it cannot be a source of infallible truth except as explained by the Bible. Otherwise evolution "based" on nature becomes invulnerable. One of these sources of truth must be subservient to the other. Nature is not possible

\*Mr. George Bedigian is an associate member of the Creation Research Society living at 1 Phillipse Road, Yonkers, N. Y. 10701.

without a Creator. This is not just authority, but the only reasonable base for operating.

The author adheres completely to six actual days of creation. He writes, "If we assert that we can set aside the six-day creation doctrine, we have asserted our supremacy over Scripture." (p. 45) "Every doctrine of Scripture is undermined when strict creationism is undermined." (p. 49) Acceptance of process could recognize God without having to worship Him. Process allows keeping contact with before and after, Satan and God, chaos and perfection. Process does not create; it takes a divine act to create.

Included in this book is a critique of Jan Lever's, *Creation and Evolution*. Lever feels that Scripture deals with categories and principles, but not details that can be investigated by scientists. Thus faith and fact, reason and revelation, God and creation are in two separate worlds. This dualism is no help to cause of creationism, because "... to record only chance-processes can ... record nothing" (p. 110).

Rushdoony also included a critique of, *Evolution and Christian Thought Today*, edited by Mixter. While authors of this symposium express themselves carefully, Scripture is not given full authority. The Bible text must be over-riding, and not influenced by current modes of thought. Genesis one is more than figurative. While nature declares the glory of God, it does not explain God, since it does not contain all of God. In turn, however, nature cannot be explained apart from God.

Indexes to Scripture references, and to references used in the footnotes, would have been added aids for readers of this book.

\* \* \*

*Evidences for Creation*, prepared by Walter Lang, published by Bible-Science Association, 1969, pp. 94. \$1.00.

Reviewed by Warren R. Howard.\*

This book is a composite of six articles by Henry M. Morris, Martin Naumann, John W. Klotz, and Raymond Surburg. Each of these essays had been previously given at a Creation Seminar at Concordia Seminary in 1968 and published in the *Bible-Science Newsletter* in 1968 and 1969.

Morris points out that the Bible is the only reliable record we have for understanding the geological record in terms of a world-wide, year-long flood. He writes, "It should be possible to fit everything into the Biblical framework and ultimately to have the most consistent and satis-

fying explanation of all the data." (p. 7.) From this view-point he discusses secular history, mythology, geologic facts and theory, and Biblical statements to show how the Bible picture of the pre-flood world is reasonably consistent with what facts we have.

Morris also covers "the Bible and Thermodynamics" and shows plainly how the First (Conservation of Energy) and Second (increase of entropy) Laws of Thermodynamics fail to support evolutionary theory. Both of these basic laws, however, are consistent with the Bible doctrines of creation and flood with the scriptures interpreted by a literal and straight-forward method.

Naumann covers the concept of space in the Bible. He shows how the Bible writers seem to go out of their way to avoid mythological concepts and do not actually present a cosmological picture. The Bible does make contact between time and eternity, in some ways beyond understanding with our logic. But neither the "three-storied world" nor an existential rationization should be read into Scripture.

Klotz examines the limitations of the scientific method especially in dealing with theories about the past. He points out that extrapolation is only valid where it can be tested, yet much of evolutionary theory "is extrapolation back in time of processes which are going on at present," (p. 44.) Both evolution and uniformitarianism bring faith into scientific activity and remove verification from the scientific method, and this is not usually understood by many people.

Klotz also takes a look at the evidence for evolution and for special creation. He shows that there are problems for the theory of special creation and also for the theory of evolution. He discusses mainly fossils and fossil reconstructions, geographical distribution, and mechanisms of change (such as mutation). We do not have all the information that we would like to have, but Klotz adds, "With what we have, it would be illogical to reject special creation and to accept evolution as the final answer to the problem of origins." (p. 58.)

Surburg in discussing "The Mythical Interpretation of the Early Chapters of Genesis" shows how unnecessary it is to use a non-literal or mythological interpretation of Genesis. Those who advocate a mythological interpretation are simply agreeing with scientists who are governed by a naturalistic philosophy of life (p. 67). He shows that there is no need to see a contradiction between Genesis one and two, and most important of all he uses the New Testament evidence to support a literal interpretation of the creation account. "Christ Himself in Matthew

\*Warren R. Howard (A.B. in biology) is Extrusion Superintendent, Tubbs Cordage Company, 501 W. Palm Ave., Orange, California.

19:3-9 clearly considers the Genesis Creation account as an historical narrative.” (p. 83.)

When this life is over for each of us several questions are sure to be raised: Why did we believe what we did? Was the evidence favoring creation sufficient to support faith in the Bible? Was the evidence favoring evolution sufficient to support faith in the theory of evolution? I am convinced that a thorough and impartial study

of available evidence strongly favors the person with faith in the Bible—a literalistic faith.

Contents of this short book are relevant to most of the key areas. The authors show where the problems are yet unsolved, but they clearly describe evidence for creation and evidence against evolution which in *the last analysis* will justify the Christian's faith over against the evolutionist's faith.

## ARTICLE REVIEW

*Picea diettertiana*, A New Species of Petrified Cones from the Oligocene of Western Montana by Charles N. Miller, Jr. 1970. *American Journal of Botany*, 57(5):579-585.

Reviewed by George F. Howe.\*

Anatomically, the silicified cones are very similar to those of the recent species and indicate that all important features of the latter had evolved by Oligocene time. (p. 579)

The origin of the flowering plants was called the “abominable mystery” by Charles Darwin. Now it appears that Paleobotany presents some new mysteries—one of them being the origin of spruce trees.

In this careful paper, the author records a species of spruce cone located in Oligocene strata of Montana. In many ways these fossil cones agree quite closely with cones of living species of spruce and only of spruce. Spruce cones are distinctive and not easily confused with cones of douglas fir, fir, hemlock, or other gymnospermous trees (see Figure 1).

These facts led Dr. Miller to conclude that cones typical of spruce had evolved by the Oligocene “. . . and that the important stages in the derivation of *Picea* cones from their ancestors must have occurred earlier.” (p. 585)

The creation scientist is fascinated by such evidence. Here are fossil bodies (cones) which by the structure of their cone scales, seeds, seed wings, and cell anatomy are clearly of the spruce category. The overall cylindrical shape also confirms their identity as quite obviously spruce cones.

The deeper rock strata give no record for evolutionary origin of the spruce. When evidences of spruce trees are seen in strata they are mute testimony to the rapid creation of this lovely tree “after his kind” as indicated in Genesis 1:11.



Figure 1. *Picea breweriana*. This figure shows the cone and branch of the weeping spruce, *Picea breweriana*. The fossil spruce cone analyzed by Dr. Miller had a structure quite similar to such “recent” spruce cones. Detail in the fossil was so clear that Miller wrote, “The thickness of the scale just behind the apex, however, indicates that it must have been woody as in *Picea breweriana*, *P. glauca*, *P. mariana*, and *P. rubens* . . . rather than papery as in *P. engelmannii*, *P. pungens*, and *P. sitchensis*.” (p. 583).

The picture above was taken from p. 85 of Sudworth, George B. 1908. (Forest trees of the Pacific slope. U. S. Dept. of Agr. Forest Serv., U. S. Govt. Printing Office, Washington, D. C. This excellent book, which was out of print for many years, has been reprinted in original form as a paperback by Dover Publications, Inc., 180 Varick St., New York, N. Y.

\*George F. Howe, Ph.D., is Chairman of the Division of Natural Sciences, Los Angeles Baptist College, Newhall, California 91321.

## FILMSTRIP REVIEW

"Fossils, Strata and Evolution," by John G. Read. 1970. 30-minute film strip and tape with booklet describing the scenes. Circulated by Creation Science Research Center, 2716 Madison Ave., San Diego, Calif. 92116. 87 pictures. \$20.00.

Reviewed by George F. Howe.\*

Those readers who recall the two fine papers by Dr. Burdick on supposed overthrusts (*Creation Research Society Quarterly*, Vol. 6, No. 2, pp. 96-106 and Vol. 6, No. 1, pp. 49-54) will be pleased to learn now that John Read has produced a film strip based upon this research.

By means of excellent on-the-spot color photographs and well-narrated tape, Mr. Read has

---

\*George F. Howe, Ph.D., is Chairman of the Division of Natural Sciences, Los Angeles Baptist College, Newhall, California 91321.

made Dr. Clifford Burdick's argument against overthrusting in the Empire Mountains and in Glacier National Park explicitly clear. The viewer sees how these supposedly "older" rocks with "ancient" fossils lie conformably upon rocks that evolutionists call "younger"—and yet there are none of the usual evidences of overthrusting which a geologist would expect to find.

The whole concept of overthrusting is analyzed and illustrated so that the viewer learns how an actual overthrust is formed and what evidences ought to exist in such a case.

An analysis of uniformitarian historical geology is presented and the weaknesses in logic are vividly portrayed. This filmstrip will be of value to teachers and others who want to present the "upside down" evidence of geology which favors the flood geological view as opposed to so-called "historical geology."

---

## LETTER TO THE EDITOR

### Was Augustine an Evolutionist?

By way of clarification, I should like to comment on the remarks by T. Robert Ingram, in the December, 1970, *C.R.S. Quarterly*, page 185.

When I first began to write on the relation between Christian theology and pagan philosophy about 25 years ago, I took my clue from the works of Henry Fairfield Osborn. Note these words:

Plainly as the direct or the instantaneous creation of animals and plants appeared to be taught in Genesis, Augustine read this in the light of primary causation and the gradual development from the imperfect to the perfect of Aristotle.—Osborn, H. F. 1917. *From the Greeks to Darwin*, New York, Macmillan.

Desiring to see what Augustine's teaching really was, I consulted the Catholic Encyclopedia, edition of 1907, and found these words:

In the beginning, God created all the elements of the world in a confused and nebulous mass . . . and in this mass were the mysterious germs [Augustine called them *seminales*, or seed] of the future beings which were to develop themselves, when favorable circumstances should permit—Vol. II, p. 90.

This seminal or seed condition, Osborn characterized as evolution, as the following statement makes clear:

To Augustine . . . God may be referred for a sound and thoroughly theistic conception of evolution.—Osborn, H. F. *The Earth Speaks to Bryan*, New York, Scribners, p. 26.

It was on the basis of these statements that I suggested that Augustine had brought certain ideas from Greek philosophy into Christianity. Since publication of the article Ingram refers to, "The Earth in Space and Time," (*C.R.S. Quarterly*, 7(1)26), others have raised the same question, and so I decided to check still further to see what Augustine really did teach. The New Catholic Encyclopedia, published in 1967, says this:

Augustine's teaching on the seminal reasons (*rationes seminales*), sometimes regarded as a forerunner of modern evolutionary theory, is, essentially, an attempt to reconcile . . . God's creative act with the progressive appearance of new living things throughout the course of time. . . . Newly emerging forms of life were already present at the moment of creation, not in their actual state, but in a seminal, potential, and causal condition.—Vol. I, p. 1064.

According to L. T. More (*The Dogma of Evolution*, Princeton Univ. Press, pp. 62-3), this was the kind of "evolution" taught by Aristotle. More says that Aristotle could not have developed a theory of evolution such as is taught today, because he had no knowledge of ancient life as revealed in the fossils. What he did teach was progressive development in nature equivalent to that which breeders use in improving domesticated animals within the species.

Perhaps these statements will make clear what Augustine taught. It sounds much like what is now being advocated under the term "progressive evolution," which is a new term for theistic

evolution; but it differs from the present theories of evolution of the vast array of living kinds from some common, simple ancestry.

As to Augustine's views of creation week, I went to his *City of God* and his *Confessions*, where I found that he stated strongly that the world was only about 6000 years old, but that there is no way of knowing what kind of days were meant in the Genesis record. It is apparent that the appearance of Adam at the close of the creation "day" was only about 6000 years ago, but how long these days were, Augustine did not attempt to say. Obviously he had to allow time for the progressive development from the "seminal" condition in which species were created.

All in all, I think it should be clear that he did not hold the kind of creation view advocated by the Creation Research Society and modern conservative creationists, where the days of creation

week were literal days and the types of animals were created fully complete, "each after his kind."

We might discuss the details to a much greater degree, but I think this is enough to make the point clear. If we will read the history of philosophy and Christian theology during the first five centuries A.D., we will be able to see how Augustine was trying to throw off the implications of Neo-Platonism and arrive at a consistent Christian interpretation of creation. He did a magnificent job of it, but did not reach the complete understanding of the problem as we believe we have in our day.

Sincerely yours,  
HAROLD W. CLARK, President  
Life Origins Foundation  
600 Edgemont Lane,  
Angwin, California 94508

---

## LETTERS TO RESEARCH CHAIRMAN

Dr. Larry G. Butler, 315 N. Chauncey, West, Lafayette, Indiana 47906

### Offers Data Processing Help

I would like to offer data processing help for creation research projects. I have inclosed application manuals and other material which show programs available free of charge from IBM for use on our equipment. Special programs needed could be written in Fortran by researcher or by myself as time allows. The following equipment is available to me when free from normal duty.

DATA PREPARATION AND TRANSMISSION (off line)

IBM 029 KEY PUNCH

BELL ASR 35 DIAL UP TELETYPE

DATA INPUT (on line)

IBM 1442 Punched Card Reader  
and Punch

IBM 1134 Paper Tape READER

IBM 1130 Typewriter Keyboard

DATA STORAGE AND PROCESSING

IBM 1131 central processing unit—8,192  
word core storage of 16 bit  
binary words

IBM 1131 Disk Storage Unit — 512,000  
word storage of 16 bit binary  
words

DATA OUTPUT (on line)

IBM 1442 CARD Punch

IBM 1132 Line Printer

IBM 1130 Ball Typewriter

IBM 1055 Paper Tape Punch

If I can be of help now or in the future please write

THOMAS A. READ  
4142 Joan Drive  
Dorr, Michigan 49323

### On Research Challenges

I read your list of research challenges in the September issue of *CRS Quarterly* (September, 1970, pp. 88 and 89). The investigation of mine shafts, etc. for growth rate of stalactites brings back memory of a railroad bridge over N. Arch St. in Alliance, Ohio, which must be 10,000 years old. It had a stalactite a foot long hanging from its underside.

Sincerely yours,  
FRANK VOSLER  
8011 Morse Road  
New Albany, Ohio 43054

---

## ERRATUM

In the article, "The Structure and Fabric of Geology," by Clifford L. Burdick, in *Creation Research Society Quarterly* 7(3):142, December, the word "Flood" should be deleted from the second line of the third paragraph of the abstract. The statement will then read, "Although biologists look to geology for evidence for organic evolution, according to the law of superposition, some geologists reason in a circle; . . ."

## INDEX FOR VOLUME 7 OF CREATION RESEARCH SOCIETY QUARTERLY 1970-1971

*Subscription year for the Creation Research Society begins with issue Number 1 in June and continues through publication of three other quarterlies which usually appear in September, December, and March.*

*All pages of the four quarterlies have been numbered consecutively; hence only the beginning page number is provided for each reference.*

*All Article, Book and Filmstrip Reviews are listed in separate sections at the end of this Index according to titles.*

### A

Are There Corporeal Living Beings Outside the Earth? By Harold Armstrong, 38  
Armstrong, Harold W.

Are There Corporeal Living Beings outside the Earth?, 38

Comments on Scientific News and Views, 75, 119, 154, 231

### B

Barnes, Thomas G.

Origin and Development of the Universe, 51  
Brauer, Oscar L.

Parathyroid Hormone Functions: Wonderfully Made, 118

Only God Could Have Made the Defense Systems of the Human Body, 152

Burdick, Clifford L.

Structure and Fabric of Geology, The, 142

### C

Carbon-14 and the "Age" of the Atmosphere. By Melvin A. Cook, 53

Clark, Harold W.

Earth in Space and Time, The, 25

Clementson, Sidney P.

Critical Examination of Radioactive Dating of Rocks, A, 137

Comments on Scientific News and Views. By Harold Armstrong, 75, 119, 154, 231

Cook, Melvin A.

Carbon-14 and the "Age" of the Atmosphere, 53

Cousins, Frank W.

Is There Life on Other Worlds?, 29

Creation and the Origin of Sex. By William Stroud, 104

Creation Outreach. By William J. Tinkle, 159

Critical Examination of Radioactive Dating of Rocks, A. By Sidney P. Clementson, 137

Critique of Stellar Evolution. By George Mulfinger, 7

Cyclical Black Shales, The. By Walter G. Peters, 193

### D

Dedication to Walter E. Lammerts, 3

Dooyeweerd and Creationism. By Samuel T. Wolfe, 227

### E

Earth in Space and Time, The. By Harold W. Clark, 25

### G

Geo-ecological Explanation of the Fossil Record Based upon Divine Creation, A. By Randall Hedtke, 214

Gish, Duane T.

Nature of Speculations Concerning the Origin of Life, The, 42

### H

Hedtke, Randall

Geo-ecological Explanation of the Fossil Record Based upon Divine Creation, A, 214

Henning, Willard L.

Tropical Gecko—A Ceiling Walker, The, 74

Howe, George F.

Note on Human Aggression—No Monkey Business, 246

Textbooks in Tennessee, 160

Human Footprints in Rocks. By Wilbert H. Rusch, Sr., 201

### I

Is There Life on Other Worlds? By Frank W. Cousins, 29

Is the Universe a Thermodynamic System? By Emmett L. Williams, Jr., 46

### L

Lammerts, Walter E.

Universities and Colleges Having the Creation Point of View, 72, 117, 229

### M

Mesa Basalt of the Northwestern United States, The. By Stuart E. Nevins, 222

Moore, John N.

Should Evolution Be Taught?, 105

Mulfinger, George

Critique of Stellar Evolution, 7

Mystery of Buried Redwood, The. By V. L. Westberg, 80

### N

Nature of Speculations Concerning the Origin of Life, The. By Duane T. Gish, 42

Nevins, Stuart E.

Mesa Basalt of the Northwestern United States, The, 222

Note on Human Aggression—No Monkey Business. By George F. Howe, 246

**O**

- Only God Could have made the Defense Systems of the Human Body. By Oscar L. Brauer, 152  
 Origin and Development of the Universe. By Thomas G. Barnes, 51  
 Origin of Life on Earth, The. By Gary E. Parker, 97

**P**

- Parathyroid Hormone Functions: Wonderfully Made. By Oscar L. Brauer, 118  
 Parker, Gary E.  
   Origin of Life on the Earth, The, 97  
 Peters, Walter G.  
   Cyclical Black Shales, The, 193  
 Population Control; Evidence of a Perfect Creation. By E. Norbert Smith, 91  
 Puzzling Similarities. By Evan V. Shute, 147

**Q**

- Questions for Evolutionists, 182

**R**

- Research Challenge, A, 88  
 Rusch, Wilbert H., Sr.  
   Human Footprints in Rocks, 201

**S**

- Should Evolution Be Taught? By John N. Moore, 105  
 Shute, Evan V.  
   Puzzling Similarities, 147  
 Smith, E. Norbert  
   Population Control: Evidence of a Perfect Creation, 91  
 Stroud, William  
   Creation and the Origin of Sex, 104  
 Structure and Fabric of Geology, The. By Clifford L. Burdick, 142

**T**

- Textbooks in Tennessee. By George F. Howe, 160  
 Time, Life and History in the Light of 15,000 Radioactive Dates. By Robert L. Whitelaw, 56  
 Tinkle, William J.  
   Creation Outreach, 159  
 Tropical Gecko—A Ceiling Walker, The. By Willard L. Henning, 74

**U**

- Universities and Colleges Having the Creation Point of View. By Walter E. Lammerts, 72, 117, 229

**W**

- Westberg, V. L.  
   Mystery of Buried Redwood, The, 80  
 Whitelaw, Robert L.  
   Time, Life and History in the Light of 15,000 Radioactive Dates, 56  
 Williams, Emmett L., Jr.  
   Is the Universe a Thermodynamic System?, 46  
 Wolfe, Samuel T.  
   Dooyeweerd and Creationism, 227

**ARTICLE REVIEWS**

- “Amino-acid Sequences of Porcine Pancreatic Elastase and Its Homologies with Other Serine Proteinases”, *Nature*, 225:802-806. 1970. Reviewed by George F. Howe, 181  
 “Evolution and Some Philosophers” (in) *Melanges a la Memoire de Charles de Koninck*. 1968. Edited by Robert Laprohon. Reviewed by John N. Moore, 179  
 “*Picea diettertiana*, A New Species of Petrified Cones from the Oligocene of Western Montana,” *American Journal of Botany*, 57(5):579-585. 1970. Reviewed by George F. Howe, 241

**BOOK REVIEWS**

- A Christian View of Modern Science*. By Robert L. Raymond. Reviewed by Bolton Davidheiser, 164  
*A Symposium on Creation*. By Henry Morris and others. Reviewed by George F. Howe, 130  
*A Symposium on Creation II*. By Donald W. Patten and Others. Reviewed by Charles McDowell, 171  
*Biblical Cosmology and Modern Science*. By Henry M. Morris. Reviewed by Charles A. Clough, 176  
*Creation—Accident or Design?* By Harold G. Coffin. Reviewed by Harold W. Clark, 168  
*Evidences for Creation*. Prepared by Walter Lang. Reviewed by Warren P. Howard, 240  
*Essays from the Creationist Viewpoint*. Edited by Paul A. Zimmerman. Reviewed by George F. Howe, 128  
*Evolution and Christian Faith*. By Bolton Davidheiser. Reviewed by Rousas J. Rushdoony, 129  
*Evolution and the Modern Christian*. By Henry M. Morris. Reviewed by Bolton Davidheiser, 164  
*Evolution and the Reformation of Biology*. By E. L. Hebden Taylor. Reviewed by Rousas J. Rushdoony, 166  
*Evolution on Trial*. By Cora Reno. Reviewed by George F. Howe, 165  
*Fossils, Flood and Fire*. By Harold W. Clark. Reviewed by Clifford L. Burdick, 170  
*Fossils, Flood and Fire*. By Harold W. Clark. Reviewed by Robert F. Koontz, 169  
*In the Beginning*. By Rita Rhodes Ward. Reviewed by Peter A. Steveson, 166  
*Man's Origin, Man's Destiny*. By A. E. Wilder Smith. Reviewed by Walter E. Lammerts, 176  
*Maps of the Ancient Sea Kings. Evidences of Advanced Civilization in the Ice Age*. By Charles H. Hapgood. Reviewed by Rousas J. Rushdoony, 167  
*Rock Strata and the Bible Record*. Edited by P. A. Zimmerman. Reviewed by Duane T. Gish, 173

"The Contributions of Edsel Murphy to the Understanding of the Behavior of Inanimate Objects." By Dr. L. Klipstein. Reviewed by Charles W. Harrison, Jr. and Elva L. Rose, 161  
*The Encounter Between Christianity and Science*, Edited by Richard Bube. Reviewed by Bolton Davidheiser, 163  
*The Monkey's on the Run*. By D. Lee Chesnut. Reviewed by Rita Rhodes Ward, 164  
*The Mythology of Science*. By Rousas J. Rushdoony. Reviewed by George Bedigian, 239  
*The Peter Principle: Why Things Always Go*

*Wrong*. By Lawrence J. Peter and Raymond Hull. Reviewed by Charles W. Harrison, Jr. and Elva L. Rose, 161

*WH<sub>2</sub>O Will Tell Him?* By Gordon L. Ginn. Reviewed by Bolton Davidheiser, 164

*Why We Believe in Creation, Not Evolution*. By Fred Meldau. Reviewed by Bolton Davidheiser, 164

#### FILMSTRIP REVIEW

"Fossils, Strata and Evolution". By John G. Read. Reviewed by George F. Howe, 242

### NOTE ON HUMAN AGGRESSION—NO MONKEY BUSINESS\*

Much research is being carried out in comparative behavioral analysis. A correspondent for *Nature* recently reported on the annual conference of the Association for the Study of Animal Behaviour in Birmingham, July 20-23, 1970 (See *Nature*, Vol. 227, No. 5257, pp. 438-439).

This conference centered on aggressive behavior in animals, but some research on human beings was reported by way of comparison. Dr. J. P. Scott of Bowling Green University asserted that human aggression followed patterns similar to those found in animals. New animals, removal of animals, or excessive crowding of animals can lead to aggression. "This type of disturbance," Scott argued, "is largely responsible for human violence." From data on animal societies, Dr. Scott is thus reasoning directly about human behavior in large city ghettos where strangers frequently move in and out of the neighborhood.

The correspondent for *Nature*, however, reported another experiment which would indicate

that human patterns of aggression bear no direct connection with aggressive tendencies in animals. His words to this point are so clear that they can be profitably quoted without additional comment:

The only contribution to describe actual research on human aggression served as an illustration to underline the difficulties of the type of cross-species comparison made by Scott, even between monkey and man. The results presented by Dr. W. C. McGrew (Edinburgh) suggested that aggression increases during the first seven days in which a group of nursery school children are put together for the first time. Similarly research on several species of monkey has produced the opposite result—aggression decreases during the first few days of group formation. Whatever the reasons for this difference, the moral is clear: generalizations *from animals to man must be treated with caution*. p. 439 (Emphasis added).

\*Note submitted by George F. Howe, Ph.D., Editor.

(Continued from Page 192)

sively that any given track must have been made by man rather than by some unknown animal with man-like feet. If we wait until we have evidence strong enough to convince some people, we would wait forever.

Recent excavations at Paluxy, conducted especially by Stanley Taylor, of the Films-for-Christ Association, uncovered many new man-like tracks in these same Cretaceous beds. These could not have been carvings and some, at least, were clearly tracks of some kind, rather than erosion phenomena. They were of shape and spacing such as men would make (especially in view of the fact that even fresh tracks are usually imperfectly formed and quickly become marred). No other *known* animal could have made them. At least, these were the conclusions of several scientists who examined them *in situ* recently. These finds will be reported in detail in a later issue of this publication.

In the Biblical context it is reasonable to believe that all animals and plants lived contemporaneously with man in the pre-Flood world. Therefore, it is entirely reasonable to expect occasional fossils and artifacts of man in any or all of the geologic strata. When these are found in pre-Pleistocene formations, (even though normally they would of course be rare in such formations) and can be reasonably well documented, they should be written up and published as soon as possible. Few other types of data are more obviously devastating to the evolutionary system.

In any case, exciting things are occurring today and it is a good time to be alive and witnessing for the Lord! "Ah Lord God! behold, thou hast made the heaven and the earth by thy great power and stretched out arm, and there is nothing too hard for thee" (Jeremiah 32:17).

## GUIDELINES FOR CONTRIBUTORS

Editors of Creation Research Society publications ask all contributors to use the following guidelines for preparing manuscripts submitted for publication. It is our goal to keep such restrictions to a minimum thereby insuring a freedom of expression not often found in scientific writing.

*Manuscripts* should be submitted to the Editor in triplicate—one original copy and two photocopied or carbon copies for use by reviewers. Manuscripts must be typed double-spaced with good black ribbon on one side of the page only. At least one inch should be used for all four margins so the Editor will have space for his instructions to the printer, or for queries to the author. All manuscripts should be in English. Pages should be numbered consecutively, including all inserted pages. Typing the contributor's last name before the number of each page is good insurance against loss of any pages in editorial handling.

An *abstract* of from 100 to 200 words should be included with the manuscript. The abstract should contain a summary of the entire article, briefly giving representative coverage to such possible areas as data presented, concepts discussed, conclusions established, etc. Letters, book reviews, or articles less than one journal page need not contain an abstract.

If *corrections* and *insertions* in the manuscript are very brief, type or print them legibly *above* the line involved. If corrections are lengthy, then re-type the page involved with carry-over on a new page with number consistent with entire manuscript.

Authors are encouraged to use *illustrations*, *drawings*, and/or *tables of data* to increase reader understanding of the subject discussed. Only "glossy" prints of photographs should be submitted. These will be retained by the Editor unless specific request for return is received with the manuscript. To facilitate prompt review of the manuscript by two or more referees, send copies of illustrations for mailing to referees. Such copies may be rough but should convey the same information as the originals. Illustrations should be referred to as "Figure 1", and numbered consecutively in order of use in the manuscript. *Captions* for illustrations should be assembled on a separate page, not attached to the figures. All drawings should be completed in black ink to insure high quality reproduction. All tables should be submitted on separate pages at the end of the manuscript. Tables should be numbered consecutively in order of use in the manuscript. Indicate on the manuscript where figures, drawings and tables should be inserted in the text.

*References* used should be listed at the end of the paper in the order of use. Literature citations in the text should be designated by consecutive numbers only. Each number will refer to the appropriately numbered source in the reference list at the end of the paper. The first reference to any source should include complete bibliographic information in this order: author (or possibly editor); date; title of book or article (and title of symposium volume if such); volume, number, and pages (if an article); publisher; city.

Two or more consecutively numbered references in the body of the article to the same source can be handled in the reference list by use of *Ibid.*, with new pages given. Later references to that same work (not in direct sequence) should be designated by Author, *Op. cit.*, and new pages cited.

This system avoids injecting bibliographic material into the text, but localizes it in the reference list at the end. It also guarantees a complete citation for interested readers. Several typical forms follow by way of example:

### References

<sup>1</sup>Smith, G. M. 1950. The fresh-water algae of the United States. Second Edition. McGraw-Hill Book Co., Inc., N. Y., p. 434.

<sup>2</sup>*Ibid.*, p. 436.

<sup>3</sup>*Ibid.*, p. 307.

<sup>4</sup>Ris, H., and R. N. Singh. 1961. Electron microscope studies on blue-green algae, *Journal of Biophysical and Biochemical Cytology*, 9:63-80.

<sup>5</sup>Smith, G. M. *Op. cit.*, p. 482.

<sup>6</sup>Corner, E. J. H. 1961. Evolution (in) Contemporary botanical thought. Edited by Anna M. MacLeod and L. S. Copley. Quadrangle Books, Chicago, Ill. p. 417.

<sup>7</sup>A "clone" of plants is a group of adult plants originally derived from one parent plant by means of vegetative reproduction.

<sup>8</sup>Ris, H., and R. N. Singh. *Op. cit.*, p. 69.

*Galley proof* will be sent to each author and should be corrected immediately on receipt and returned to the Managing Editor. Authors should provide a forwarding address including zip code designations if they move from the address sent with the manuscript.

Arrangements for *reprints* are possible through correspondence with the Managing Editor; yet, to serve members in the most economical way, the Editors assume that the author will utilize photocopying methods available to him to obtain copies of articles in most cases.

Manuscripts should be addressed to Editor George F. Howe, *Creation Research Society Quarterly*, 24635 Apple Street, Newhall, California 91321.

**Our Society of research scientists representing various fields of successful scientific accomplishment is committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms.**

**We propose to re-evaluate science from this viewpoint. Beginning in 1964, we are publishing an annual yearbook of articles by various members of the Society and thereafter a quarterly review of scientific literature. Our eventual goal is the realignment of science based on theistic creation concepts and the publication of textbooks for high school and college use.**

- 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.**

Dues are \$7.00 (Foreign, \$8.00 U. S.) per year and may be sent to Wilbert H. Rusch, Sr., Membership Secretary, 2717 Cranbrook Road, Ann Arbor, Michigan 48104. Voting membership is limited to scientists having at least a Masters degree in a natural science. Sustaining non-voting membership is open to those who subscribe to the above statement of belief at \$7.00 (Foreign, \$8.00 U.S.) per year and includes subscription to Annual and Quarterlies. All others interested in receiving copies of these publications may do so at the rate of the subscription price for all issues for one year: \$10.00 (Foreign, \$11.00 U. S.).

The Board of Directors includes the following:

Harold Armstrong, MS., Physicist; Queens University, Kingston, Ontario, Canada  
Thomas G. Barnes, D.Sc.; Physicist, Professor of Physics, The University of Texas at El Paso and Consultant to Globe Universal Sciences, Inc., 2115 N. Kansas Street, El Paso, Texas 79902  
Clifford L. Burdick, Hon. Ph.D., Consulting Geologist, 629 East 9th Street, Tucson, Arizona 85705  
Larry Butler, Ph.D., Biochemist; Purdue University, Lafayette, Indiana 47907  
Wayne Frair, Ph.D., Biology, The King's College, Briarcliff Manor, N.Y. 10510  
Duane T. Gish, Ph.D.; Biochemist, Upjohn Company, Kalamazoo, Michigan 49001  
John J. Grebe, D.Sc.; Nuclear Physicist, 1505 West Andrews Drive, Midland, Michigan 48640  
George Howe, Ph.D.; Botanist, Los Angeles Baptist College, Newhall, California 91321—Editor  
John W. Klotz, Ph.D.; Geneticist, Concordia Senior College, Fort Wayne, Indiana 46805  
Richard G. Korthals, M.S.; Physics, Astronautics, Concordia Junior College, Ann Arbor, Michigan 48104  
W. E. Lammers, Ph.D.; Geneticist, Freedom, California 95019  
Karl W. Linsenmann, M.D., Physician and Surgeon; Midland Medical Center, Midland, Michigan 48640  
John N. Moore, Ed.D.; Science Education, 136 Brody Hall, Michigan State University, East Lansing, Michigan 48823  
Henry M. Morris, Ph.D.; Hydraulics and Hydrology, Virginia Polytechnic Institute, Blacksburg, Virginia 24060—President  
Wilbert H. Rusch, Sr., M.S., Sc.S.; Biology, Geology, Concordia Junior College, Ann Arbor, Michigan 48104  
Harold Slusher, MS.; Geophysicist, Asst. Professor of Geophysics and Director, Kidd Memorial Seismological Observatory, University of Texas at El Paso, Texas 79902  
William J. Tinkle, Ph.D.; Geneticist, Anderson College, 112 South St., Eaton, Indiana 47338 (retired)—Secretary  
Emmett L. Williams, Jr., Ph.D.; Chemist, Bob Jones University, Greenville, South Carolina 29614