Creation Research Society Quarterly

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

VOLUME 28 JUNE 1991 NUMBER 1

Support the Laboratory Project

CREATION RESEARCH SOCIETY QUARTERLY

ISSN 0092-9166

VOLUME 28 JUNE 1991 NUMBER 1

Notice of change of address, and failure to receive this publication should be sent to Glen W. Wolfrom, P.O. Box 14016, Terre Haute, IN 47603.

Creation Research Society Quarterly **is published by the Creation Research Society, P.O. Box 14016, Terre Haute, IN 47803.**

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

Instructions to authors can be found in June Quarterly.

This publication is available in microform from University Microfilms International.

Call toll-free 800-521-3044. Or mail inquiry to: University Microfilms International, 300 North Zeeb Road. Ann Arbor, MI 48106.

Cover Photograph

Millipede, likely *O. ornatus,* seen along the bank of the Colorado River near Diamond Creek moving toward shady area. Photograph by Glen W. Wolfrom.

TABLE OF CONTENTS

Membership Application 3

Order Blank for Past Publications 4

Instructions to Authors 5

Editor's Comments 6

Dedication to Emmett L. Williams 6

A Desert Millipede: Evolution or Design? — An Introduction 7
Emmett L. Williams, George F. Howe and Richard R. White

The Correct Approach to Scientific Theories ... 17
Apostolos Ch. Frangos

Symposium on Variation
A Refinement of Biosystematics which Reflects Baraminic Variation 18
Paul A. Bartz

Original Kinds and Turtle Phylogeny 21
Wayne Frair

The Limits of Biological Variation 24
Darrel Kautz

Similarities and Diversity Among Organisms: Which World-View Do They Support? 25
G. T. Javor

Panorama of Science
Evolution: The Emperor's New "Science" ... 27

Reprinted *CRSQ* Volume 4 27

The Coelacanth's Finny Joints 29

Boulder Found in Coal Seam — implications 29

Index to Volume 27 of the *Creation Research Society Quarterly*. 31

Does Neo-Darwinian Principle of Homology Work at the Genome Level? 33
Dimitrij A. Kouznetsov and Andrey A. Ivanov

Philosophical Essay
Historical Variation in the Human Creature ... 35
L. MacAoidh

Book Reviews (3) 37

Letters to the Editor (4) 40

MEMBERSHIP/SUBSCRIPTION APPLICATION FORM
CREATION RESEARCH SOCIETY

not transcribed for the cd-rom version

ORDER BLANK FOR PAST PUBLICATIONS

not transcribed for the cd-rom version

CREATION RESEARCH SOCIETY

History The Creation Research Society was first organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a real need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (with graduate degrees in science) and over 1100 non-voting members. The ***Creation Research Society Quarterly*** has been gradually enlarged and improved and now is recognized as the outstanding publication in the field.

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

Membership Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are $18.00 ($22.00 foreign) per year and may be sent to Glen W. Wolfrom, Membership Secretary, P.O. Box 14016, Terre Haute, IN 47803. Sustaining membership for those who do not meet the criteria for voting membership, and yet who subscribe to the statement of belief, is available at $18.00 ($22.00 foreign) per year and includes a subscription to the Quarterlies. All others interested in receiving copies of all these publications may do so at the rate of the subscription price for all issues for one year: $21.00 ($25.00 foreign).

Statement of Belief Members of the Creation Research Society, which include research scientists representing various fields of successful scientific accomplishment, are 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, and since 1964 have published a quarterly of research articles in this field. In 1970 the Society published a textbook, *Biology: A Search for Order in Complexity*, through Zondervan Publishing House, Grand Rapids, Michigan 49506. All members of the Society subscribe to the following statement of belief:

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 humans, 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 a historical event worldwide in its extent and effect.

4. We are an organization of Christian men and women 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 Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.

INSTRUCTIONS TO AUTHORS

1. Manuscripts shall be typed and double spaced.
2. An original plus two copies shall be submitted to the editor of the Quarterly.
3. All submitted articles will be reviewed by at least two technical referees. The editor may or may not follow the advice of these reviewers. Also, the prospective author may defend his position against referee opinion.
4. The editor reserves the right to improve the style of the submitted articles. If the revisions of the editor and referees are extensive, the changes will be sent to the author. If the changes are not suitable to the prospective author, he may withdraw his request for publication.
5. Due to the expense involved, manuscripts and illustrations will not be returned to authors.
6. All references (bibliography) must be presented in the style shown in the Quarterly. If a prospective author is not familiar with the CRS format, the editor will furnish an example reference page.
7. All figures and drawings must be prepared professionally. No sloppy hand drawings or freehand lettering will be accepted. The editor reserves the right to approve submitted figures. Unacceptable illustrations will result in rejection of the manuscript for publication. Do not send slides.
8. Any manuscript containing more than 25 pages is discouraged. If a topic cannot be covered to the author's satisfaction in this length of pages, the author *must* divide his material into separate papers that can be serialized in the Quarterly.
9. The Quarterly is a journal of original writings. Only under unusual circumstances will we reprint previously published manuscripts. Never submit an article to two or three journals, including ours, hoping all of them will publish your work. We consider this practice unethical. When submitting an article, please state if the material has been published previously or has been submitted to other journals.
10. Book reviews should be limited to 500 words or less.

Editor's Comments

The Symposium on Variation continues with three additional papers. Paul Bartz discusses some new information on the subject as well as bringing in past studies on gaps between living organisms. His essay is quite positive in its approach and he looks forward to more creationist efforts in the field. Wayne Frair presents turtle phylogeny in relation to original kinds. Dr. Frair has devoted considerable time in his professional career doing research on turtles and discusses his biochemical findings in this paper. Darrel Kautz offers a short philosophical selection on the limits to variation in living organisms. He emphasizes design and the supernatural aspects of the topic. George Javor considers similarities and diversity in living things and concludes that they support a creation model.

Apostolos Ch. Frangos explains the scientific method and a correct philosophy of science—a topic so often presented in the past in the Quarterly. It is a pleasure to have another research article from Dr. Dimitrij Kouznetsov on his studies of informational biopolymers in mice. His and his associate's data indicate that caution should be exercised in accepting conclusions based on the data of DNA-RNA homology among similar organisms.

Emmett Williams, George Howe and Richard White give an excellent paper on some field work on *Orthoporus ornatus*, a desert millipede. They also discuss some past creationist work on convergence and develop a creationist interpretation of this topic. The authors prefer a design viewpoint when discussing the habits, structure and function of the millipede. Its defense mechanism, locomotion capability and food preference are quite interesting. This study was sponsored by the Research Committee of the Society.

The shorter technical notes on coelacanth, coal formation and the creation/evolution debate may be of interest to you. The Quarterly should be available in every college and university library to be used as a reference source. You are encouraged to do what you can in your area to make this possible. We need your help. Also let me hear from you concerning the articles, notes and letters in this and past issues. Please write to me, I welcome your manuscripts.

Don DeYoung, Editor

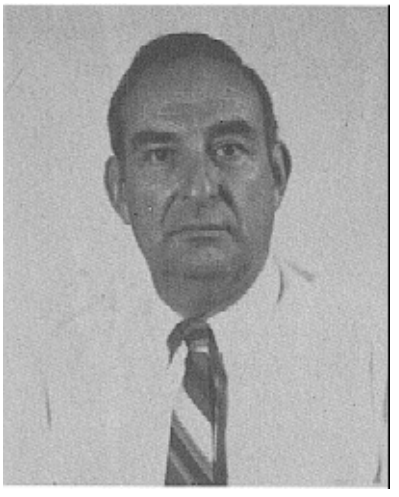
DEDICATION TO EMMETT L. WILLIAMS

There are members of the Creation Research Society who, after having been elected to the Board of Directors, serve the Society in both a capacity and a manner that is out of the ordinary. Such is one of the newest fellows, Emmett L. Williams. He was elected to the CRS Board in 1967 and has served in a number of official capacities since then.

He began by serving as vice-president for several years. This is not a sinecure, since the vice-president also serves as chairman of the research committee. In addition to selecting worthy projects for research, Emmett served at the time when the Society was embarking on funding for the purchase of land for a research station. He led this drive to a successful conclusion and has participated in many research projects. He has performed laboratory work and coauthored a series of papers on the precipitation of $CaCO_3$ structures. Likewise he has participated in field work in the Grand Canyon and Big Bend areas, studied geological and botanical specimens with scanning electron microscopy and energy dispersive analysis and coauthored several papers using these studies.

Emmett Williams, a true Southerner, was born in Lynchburg, Virginia. There he graduated from E. C. Glass High School. He then served in the Marine Corps from 1950-52. He entered Virginia Polytechnic Institute in 1952, graduating with the B.S. in 1956 and the M.S. in Metallurgical Engineering in 1961. It was here that he became interested in the cause of creationism while being taught in Sunday School in Blacksburg, Virginia, where his teacher was Henry M. Morris.

Emmett went on to earn his Ph.D. in Materials Engineering at Clemson University. After his graduation from V.P.I. he served 19 years in numerous positions in the academic world as well as 15 years as an engineer in industry. He has served as industrial consultant for three firms. Dr. Williams is a member of the following honorary societies: Alpha Sigma Mu (metallurgical engineering), Sigma Gamma Epsilon (earth sciences), Sigma Xi (research).



Dr. Williams also proved his literary ability and research skills when he authored numerous articles for *CRSQ* as well as a monograph, *Thermodynamics and the Development of Order*. He has also served as coauthor of elementary and secondary school level science textbooks. All these literary efforts were to serve him in good stead when he took over the editorship of the *CRSQ* from the late Harold Armstrong. Dr. Williams served as editor from 1984-1989. Since then he has directed the efforts of CRS Books. In much of his literary labors, he has been ably assisted by his wife, Mary Austin, whom he married in 1957. They now have three children and one grandchild. The Society is happy to acknowledge the many and able services of Dr. Emmett L. Williams through these many years.

Wilbert Rusch, Sr., L.L.D.

A DESERT MILLIPEDE: EVOLUTION OR DESIGN?—AN INTRODUCTION

EMMETT L. WILLIAMS, GEORGE F. HOWE, AND RICHARD R. WHITE*

Received 26 October 1990; Revised 27 February 1991

Abstract

A survey of some of the interesting functions, structure and behavior of a desert millipede, ***Orthoporus ornatus,*** *is presented. Times of surface activity, defensive mechanism, food preference and locomotion are discussed. The origin of these characteristics is best philosophically explained within a design framework.*

General Information-Millipedes

Millipedes are in the class of animals called Myriapods (many-legged). They are distinguished from other Myriapoda by the presence on most of their ring-like body segments of two pairs of legs, thus the creatures are referred to technically as Diplopoda (double-legged) [Tiegs, 1957, p. 502; Gertsch, 1990, p. 249]. Millipedes have long segmented bodies like those of caterpillars with the number of legs ranging from 20 to over 200 (Holland, 1990, p. 129). Placed in the phylum Arthropoda, class Diplopoda, the animals have bodies composed of a head and elongated trunk with leg-bearing segments (Barnes, 1968, p. 551). The length of the different species varies from less than 0.1 to 11 inches (Holland, 1990, p. 129).

The head portion of a millipede has short antennae. Generally the creatures are light-shy but most have ocelli (eyespots) (Barnes, 1968, p. 551; Holland, 1990, p. 129; Burton and Burton, 1989, p. 1613). However the Juliformia order of millipedes usually have eyes (Barnes, 1968, p. 558). Millipedes have chewing mouthparts with two pairs of jaws (Smith, 1982, p. 27: Blower, 1985, p. 3). Most species of millipedes eat decaying plant matter** but they will eat living vegetation also. The animals are generally colored black or brown, yet some are red, orange or mottled (Holland, 1990, p. 129) with a luminous species *(Luminodesnus sequoiae)* noted in California (Buchsbaum, et al., 1987, p. 404).

There are 10,000 described species placed in 10 orders widely distributed in both temperate and tropical regions and it has been estimated that possibly there remains 70,000 undescribed or undiscovered species (Barnes, 1968, p. 551; Barnes, et al., 1988, p. 240; Blower, 1985, p. 1). These secretive egg-laying animals normally live under rocks and wood and in soil and humus. See Figure 1 for sketches of various types of millipedes.

Observations of a Desert Millipede

Geological expeditions were-made to the Big Bend National Park in May 1988 and July 1990. Likewise field work was performed in and around Grand Canyon National Park in June 1990. All trips were under the auspicies of the Research Committee of the Creation Research Society. It had rained in these areas immediately before the field work and in July 1990 scattered continued in the area while the studies were showers in progress.

*Emmett L. Williams, Ph.D., 5093 Williamsport Drive, Norcross, GA 30092; George F. Howe, Ph.D., 24635 Apple St., Santa Clarita CA 91321; Richard R. White, B.A., 2421 Brown Deer Trail, Acworth, GA 30101.

**Certain species of millipedes are predatory (Holland, 1990, p. 129) and some tropical varieties eat dead insects (Buchsbaum, et al., 1987, p. 404).

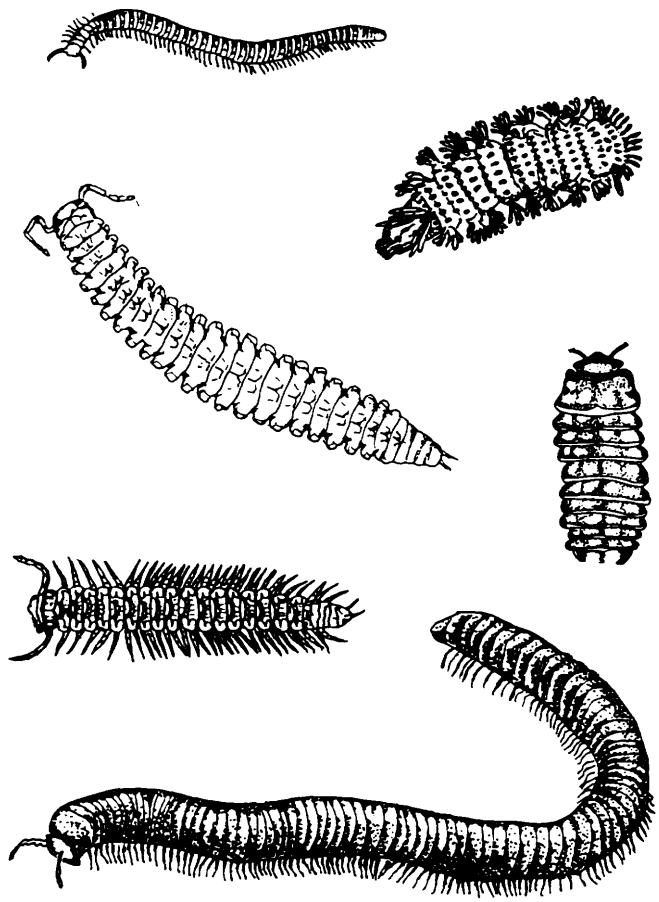


Figure 1. Representations of several types of millipedes (after Barnes, et al., 1988; Smith, 1982). Drawings by Randall R. Smith

At Big Bend the desert millipede is identified as *Orthoporus ornatus* (Girard) [Wauer, 1980, p. 106]. Many were observed throughout the Chihuahua Desert region of the Park, May 21-24, 1988 and July 16-19, 1990. The millipedes can be seen crossing the major roads in the Park after rains and visitors often joke about the evasion tactics taken by automobiles to avoid crushing the moving animals.

On June 11, 1990 three specimens, likely *O. ornatus,* were seen near the road from Peach Springs, Arizona to the Colorado River (the only place one can drive to the Colorado River in the Grand Canyon) down Peach Springs Canyon or Wash (Hamblin and Rigby, 1969, pp. 98-103). The Hualapai Indian Nation maintains the road and permits to travel on it must be purchased at the Hualapai Nation Office at Peach Springs or the service station across the street in the event that the office is closed.

Two of the specimenns were seen while studying a geologic formation about 1-2 miles from where Diamond Creek enters the Colorado River (Mile 225.6) at Peach Springs Canyon (Figures 2 and 3). The other millipede was seen traveling across the bank of the Colorado River about 50 feet south from where Diamond Creek enters the river (Figures 4 and 5).

Figure 2. Millipede, likely *O. ornatus,* seen in Peach Springs Canyon, June 1990.

Range and Habitat

Causey (1975) discussed the locations where the spirostreptid millipede O. *ornatus* has been found in the southwestern United States and northern Mexico. Both Causey (1975, p. 3) and Crawford, et al. (1987, p. 65) showed the range of the animal as far south into Mexico as a latitude of 20°N. The known locations of the species as of 1975 in the southwestern United States are shown in Figure 6. The millipede is widely distributed in the Chihuahua and Sonoran deserts, with population densities estimated at about 600/acre (Wallwork, 1982, p. 40; MacMahon, 1987, p. 521).

Considering this wide distribution, *O. ornatus* obviously is able to survive several different environments. Generally it lives in semi-arid to arid climates (Crawford, et al., 1987, p. 65). Also the amount and timing of the rainfalls, vital for the active period of its life, vary throughout its range. Crawford, et al. (1987, p. 67) outlined the regional environments of the millipede:

> Topographies, soils and vegetation in *O. ornatus* habitats . . . are by no means equivalent throughout the species range, although combinations of these habitat features must provide populations with adequate shelter if drought, heat and cold are to be survived. Shelter often takes the form of rodent burrows and ant nests, . . . large surface stones and rock outcrops. Basalt-flow habitats confer excellent shelter to the north . . . . as do the lower slopes and terraces of large riparian channels such as those created by the Colorado River in the Grand Canyon. . . . Such places probably constitute warm, post-Pleistocene refugia ('thermal islands' in effect) separated by terrain in which soils often freeze during winter. In contrast, populations to the south are commonly distributed over broad, flat expanses having surfaces of desert pavement. . . .
>
> Sandy loam aridosols are probably the most characteristic soils of *O. ornatus* habitats. Powdery grey loam, comparatively heavy in clays, characterizes a flood plain used extensively by *O. ornatus* in western Texas.

Figure 3. Typical terrain seen in the lower portion of Peach Springs Canyon where millipedes were found.

Figure 4. Cover Photograph.

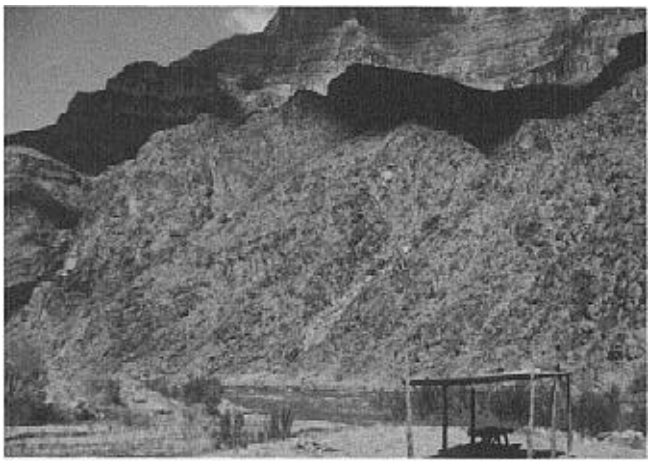


Figure 5. Colorado River in Grand Canyon where Diamond Creek flows into the river. Millipede in Figure 4 was found in this area. Diamond Creek can be seen in the left foreground and picnic table constructed by Hualapai Indian Nation is seen in the right foreground. Photograph by Glen W. Wolfrom

Times of Surface Activity

Most millipedes live in mesic environments (balanced supply of moisture), therefore one can find the animals by overturning stones, decaying wood, etc. anytime the weather is sufficiently warm. Likewise they typically avoid light. However *O. ornatus* is active on the soil during *daylight* yet only for a brief period during the rainy season, usually after summer rains (Wallwork, 1982, p. 40; Wauer, 1980, p. 107). As Crawford and Wooten (1973, p. 21) stated:

> Perhaps the most striking feature of this animal's life is that it appears to feed for a very limited time of the year, unlike millipedes living in forest litter . . . responsiveness to a reasonably predictable rainfall pattern during the warmer parts of the year has obviously evolved in this species. Early rains during the late spring appear to trigger

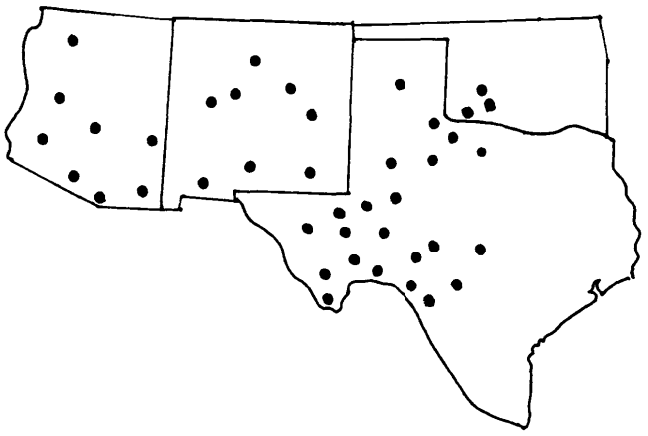


Figure 6. Range of *O. ornatus* in southwestern United States (after Causey, 1975). Drawing by Randall R. Smith

> an annual molt and to arouse the otherwise quiescent millipedes to a state allowing later surface foraging.

Also late rains can cause surface activity of this species.

Wallwork (1982, p. 41) explained this behavior as follows:

> In hot deserts, species that restrict their periods of surface activity to times of the year when they would experience the least environmental stress would have a selective advantage. This is the rainy season . . . , the species that have become established in hot deserts are those that are surface-active at this time.

Some other factors that enable *O. ornatus* to survive the hostile environment of the desert will be discussed later.

The main point of this section is that the seemingly startling behavior of surface activity of the millipede in "broad daylight" in the hot times of the year in the desert has been verified during three particular expeditions by the authors. The sightings have occurred as mentioned earlier after rains in the hotter seasons in the desert region of Big Bend National Park and in lower slopes of the Grand Canyon area after considerable rain two days earlier.

The three millipedes sighted on June 11, 1990 were most probably foraging; one was seen moving on the terrain in Peach Springs Canyon, another seen within 50 ft. of the former, moving across the spines of a barrel cactus, *Ferrocactus* sp. (Figure 7) approximately six inches above ground level. The final sighting that day was made of a specimen on the banks of the Colorado River apparently moving toward shelter in the rock debris in that location (Figure 4).

Many of the millipedes seen in May 1988 at Big Bend were in the Dog Canyon area for much time was spent in investigating the geology of that place. Others were seen in the desert near Boquillas Canyon, Santa Elena Canyon and near Cerro Castellan. Several were observed on the banks of the Rio Grande in Madera Canyon west of Lajitas, Texas along highway 170.

As previously noted, many millipedes could be seen crossing the roads at Big Bend National Park during July 1990 but most of them were seen in and around the Javelina Formation at the northwestern end of the Park since much of the field work was done in that region. Others were seen below Reed Plateau west of the Park near Terlingua, Texas. The animals were observed eating dead vegetation on the soil surface and several were found on creosote bushes *(Larrea tridentata).* One was foraging on the decayed lower areas of an unidentified cactus plant.

Defense Mechanism

One might wonder if this relatively large millipede does not place itself at risk when it moves on the ground in the daytime. It could be imagined that many birds, rodents and lizards would enjoy a meal of *O. ornatus.* Such highly visible foraging could not be missed by sharp-eyed predators.

Wallwork (1982, p. 42) suggested:

> Daytime surface activity may also serve to lessen predation pressure since carnivorous arthropods, notably centipedes, scorpions and their relatives, are nocturnal in hot deserts.

These millipedes have defense mechanisms that can repel many daytime predators. When disturbed or threatened, the desert millipede rolls up in a spiral (Figure 8). The hard exoskeleton facing a predator may offer discouragement. Also *O. ornatus* secretes or oozes a noxious liquid substance from a set of interior glands through small pores (Figure 9) serially arranged on both sides of a trunk segment along its length. The glands are found in all segments except the first five and the last one. A representation of the structure of the glandular device likely present in *O. ornatus* is shown in Figure 10.* When prodded (Eisner,

Figure 7. Barrel cactus in Peach Springs Canyon similar to the one on which a millipede was moving across the spines.

***The exoskeleton of the millipede shown in Figure 15 had pores that were clogged with a black mass that could not be removed by extended soaking in acetone or ethyl alcohol.**

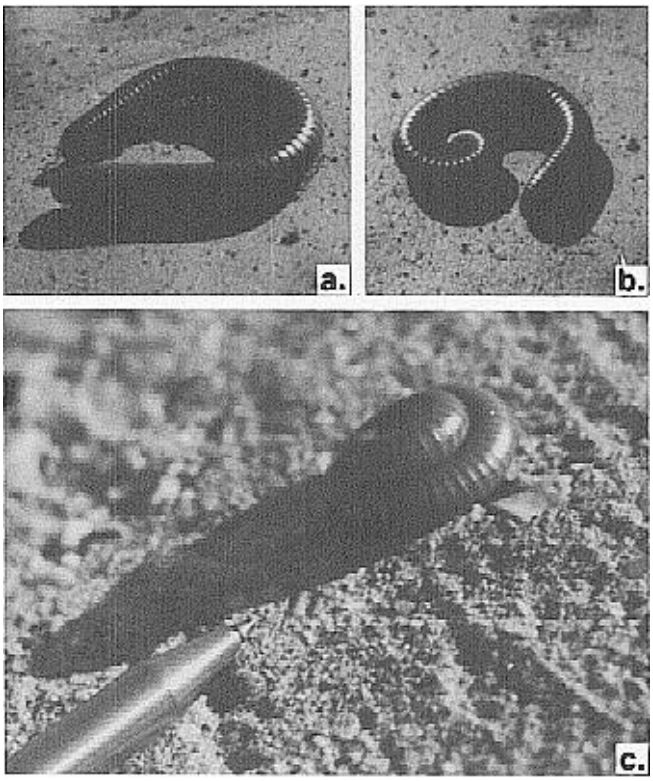


Figure 8. When a millipede senses danger or is disturbed, it will assume a defensive coil: (a) Millipede begins to coil; (b) Another millipede in the process of coiling; (c) Completely coiled millipede. Photographs by George F. Howe

et al., 1978, p. 49), a millipede discharges its secretion from the glands ***in the area*** where it is disturbed. The protective fluid apparently is stored in a spherical reservoir in millipedes of order Spirostreptida, transported through a slender tube to a valve which is opened by a muscle attached to the wall of a segment. Eisner et al. (1978, p. 44) assumed that the liquid discharge is accomplished by muscle contraction opening the valve along with simultaneous compression of the reservoir sac. Eisner and Meinwald (1966, p. 1344-45) claimed that arthropods can release fluid from the glands that are nearest to the site of a predator's attack increasing the efficiency of the defensive weapon; also see Eisner et al. (1978, pp. 58, 59). Considering the amount that is discharged at and near the location of the disturbance, an intricate sensing and control system must be required.

The defensive liquid released by *O. ornatus* has been found to contain 2-methyl-1,4 benzoquinone and 2-methyl-3-methoxy-l,4-benzoquinone (Figure 11) [Eisner et al., 1965, pp. 247-48; Eisner et al., 1978, pp. 45-46, 52]. Benzoquinones appear to act as repellents or irritants to potential predators. Once released, the liquid may coat the millipede protecting it against an immediate repeated attack. Eisner and his colleagues placed amounts of benzoquinones near or on potential predators such as birds, ants, spiders and mice. These animals reacted to the vapors and/or liquid by leaving the location of application if the fluid had been placed near them. If some portion of their exterior surface was contacted by the liquid, the potential predators immediately attempted to clean themselves to remove the noxious substance. Even frogs have been noted to reject millipedes in a laboratory situation after seizing them. Benzoquinones are also toxic. If a millipede is ingested by a predator rapidly before the presence of the defensive secretion can be detected, it could prove to be fatal. *O. ornatus* indeed possesses a fantastic defensive system to allow it to forage in the daylight hours.

Figure 9. Artist's representation of *O. ornatus* showing approximate location of pores along trunk where defensive chemical substance is emitted. Drawing by Randall R. Smith

Like all systems in nature it is not 100% effective. There are predators that can overcome or are not affected by the defense secretions emitted by millipedes (Eisner et al., 1978, pp. 63-65). Crawford, et al. (1987, pp. 81, 82) contended that lizards, shrikes and rodents cause the most trouble for *O. ornatus.* It is known that larvae of *Zarhippus* spp. (glowworm beetle) act as predators on the desert millipede. It is not known if gut parasites do any damage to the millipede or not. Do violent rains on desert terrains cause the death of many millipedes? See Figure 12 for the remains of a millipede.

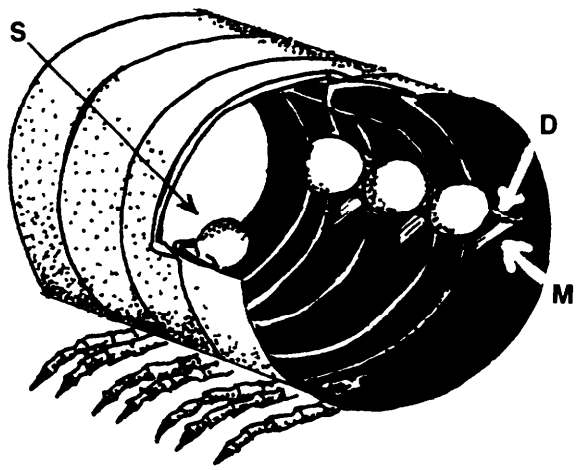


Figure 10. Gland type found in *Narceus gordanus* millipede closely similar to those found in Spirostreptida millipedes (after Eisner, et al., 1978, p. 48). Spherical sac (S) contains defensive liquid. Duct (D) leads to outer orifice. Muscle (M) opens a valve to allow liquid to secrete onto the outer surface of the millipede. Drawing by Randall R. Smith

Another defense tactic employed by the millipede was experienced by one of the authors. When the first myriapod was discovered in Peach Springs Canyon by Williams, his two colleagues were about 100 yards away. Wishing to share his discovery with them, he carefully placed the coiled millipede on a piece of shale and unwisely ran across the desert toward his companions. Losing his balance, he dropped the piece of shale and the animal. Replacing the uninjured, but greatly disturbed millipede, Williams walked to meet his friends. As he showed the coiled specimen to them, the millipede responded to this attention by

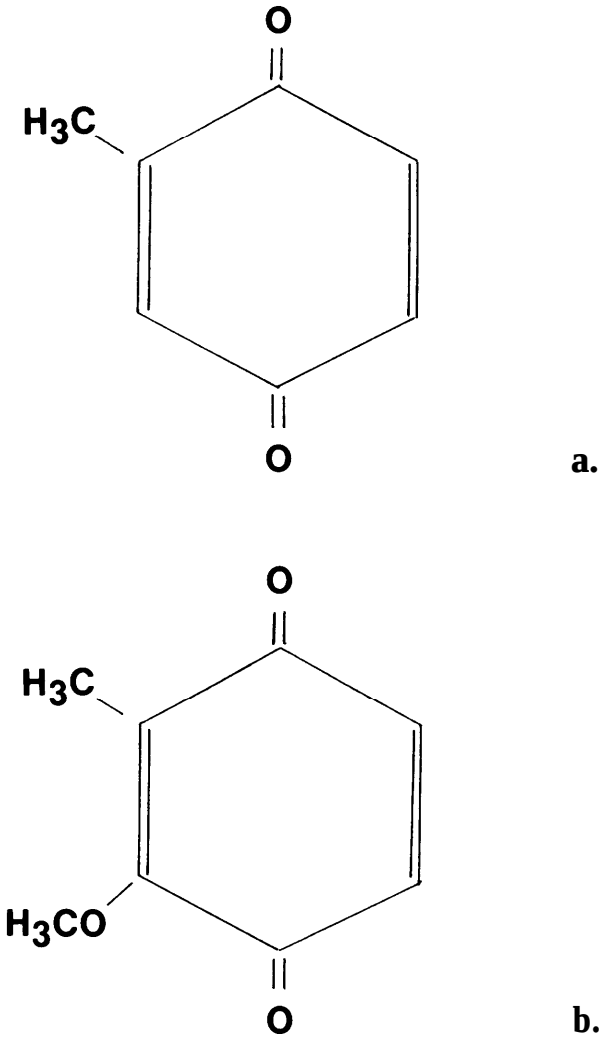


Figure 11. Structure of compounds in defensive liquid of *O. ornatus* (after Eisner, et al., 1978, p. 52). Drawing by Randall R. Smith
a. 2-methyl-1,4-benzoquinone
b. 2-methyl-3-methoxy-1,4-benzoquinone

regurgitating an unwholesome-looking black mass to repel his tormentors. The animal was returned to the desert floor.

Defense Systems—Philosophical Concerns

The origin of such defensive chemical systems is an interesting question. Eisner et al. (1978, p. 41) claimed that the defensive liquids secreted by millipedes ". . . have evolved, quite clearly, for protection against predation." Earlier Eisner and Meinwald (1966, p. 1341) in discussing the defense glands in arthropods stated:

> The glands are so variable in number, distribution, and morphological detail that there can be no doubt that they have arisen many times independently in the course of evolution.

Did nature, a chance event or some mystical driving force possessed by these organisms enable them to develop elaborate, well-controlled defense systems often similar in function that can secrete different chemical substances to protect themselves? If such events did occur, chance must be ruled out since something that happens over and over again, (independent evolution of various defense systems) under similar circumstances speaks of design and direction. Can an impersonal, unintelligent entity such as nature, realize that a certain class of animals needs some mode of defense? Can the creature itself will such changes into existence? We believe that such is not possible in a real world. Also increasing the time available to allow the impossible or unlikely to occur, does not solve the problem.

The concept of convergence or parallel evolution to develop similar systems such as defense glands increases the improbability of such occurrences happening time any time again. Such occurrences seem to fit more comfortably into a creationist framework. As an analogy, consider the wing of an airplane. The aircraft obtains lift from this essential structure. Yet in the development of airframes, there have been many types of wings designed and built into aircraft. If you were to allow an "intelligent being from outer space" utterly devoid of the knowledge that wings on airframes had been designed by engineers and ask him to arrange the structures into evolutionary sequences, he undoubtedly would develop many convergence or examples of parallel evolution. We need not resort to chance or natural selection in our modern scientific/engineering era when all of our experiences and observations deny such possibilities. The authors believe that such defense systems in arthropods could have come into existence only by design from an intelligent Creator.

However this view presents the thorny problem that nothing is 100% efficient. Did the Creator then design imperfect defense systems? Of course, the balance of nature (Williams, 1981, pp. 116-17) is involved. However, between the actual creation and our present observation of nature was the Fall of man where the Creator cursed his creation because of man's sin. Inefficiency in nature could have developed at this time (Williams, 1981, pp. 116-17).

If so, what was the purpose of defense glands in arthropods before the Fall if predation did not occur until then? Can major changes in living organisms be postulated as a result of the Fall? Many questions such as these need to be explored by creationists.

Smith (1970, pp. 91-96) discussed population control in animals before and after the Fall. He described

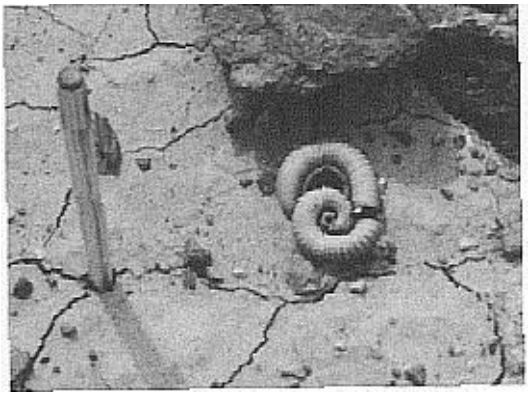


Figure 12. Gray remains (exoskeleton) of a dead millipede in Big Bend National Park—July 1990.

intrinsic population control after the Fall, i.e., cannibalism, fertility, death-age of adults and others. Could reduced fertility or increased age for sexual maturity have been factors in population control without predation before the Fall? Smith (1970, p. 92) realizing the differences in nature today compared to that postulated before the Fall, conjectured that the Fall ". . . brought about modifications to the living world."

Convergence and Parallelisms in Creationist Writings

G. F. Howe has written several papers discussing a creationist view of convergence. Rather than appeal to evolution (divergences followed by convergence), Howe (1965, p. 14) suggested that ". . . resemblances are accordingly attributable to what could be called 'creative interchange of components'." He (p. 14) noted:

> Only one postulate is essential to the creation system—the originating God. He worked by obvious outline (homology) but integrated various patterns in distinct kinds as He chose (analogy).

Parallelisms in bacteria, fungi, algae, vascular plants, guard cells and plant functions were outlined (Howe, 1965, pp. 14-19). In another treatise (1967, pp. 100-105, 115) he detailed parallelisms in algae. Howe (1975, p. 219) in a review noted that the presence of R-bodies in paramecia resembling trichocysts in protozoa and algae are problems for parallelism.

Evan Shute (1969, pp. 135-36) in the section titled "Glands Producing Defensive Secretions," quoted in its entirety below, pointed out weaknesses in assuming convergence.

> Glands of this type are so variable in every way as to demonstrate that they have arisen independently in the course of "evolution." Should we insist that they are vital to phylogeny?
>
> Arthropods of very diverse types may produce similar components in their defensive secretions. Thus the spray trans-2-hexenal occurs in Hemiptera, cockroaches, a myrmecine ant and many plants. Formic acid is secreted by ants, carabid beetles and notodontid caterpillars. The p-benzoquinones are found in beetles, earwigs, millipedes, a cockroach and a phalangid spider.
>
> On the other hand, the defensive glands in the carabid beetles produce compounds as different as m-cresol, p-benzoquinones, salicylaldehyde, formic, tiglic and methacrylic acids. Among millipedes the orders Julida, Spirobolida and Spirostreptida secrete p-benzoquinones; the *Polydesmida,* cyanogenic agents; and a species of *Chordesmida* produces a phenol. The saliva of the reduvid bug *Platymeris radamantus* resembles snake venom, both in number of proteins and in enzyme activity.
>
> What is more surprising is that agents, like 2-hexenal and alpha-pinene found in insects and termites respectively are very widespread in plants. Moreover, in cynanogenic plants, hydrogen cyanide is generated by hydrolysis of cyanohydrin glycosides. How amazing then that the polydesmid millipede, *Apheloria,* also generates hydrogen cyanide by the dissociation of mandelonitrile, the cyanohydrin of benzaldehyde! Citronella was first derived from plants, but now is known to be produced in the glands of an ant, *Acanthomyops.* Surely you are now convinced!

Could we say from the design perspective that the Creator has provided a particular arthropod with the defensive system best suited for its needs or which can be manufactured from its food supply?

Harold Armstrong (1971, p. 232) asked the question "Is convergence credible?" and stated that since vertebrates and invertebrates are much alike, they are often said to have developed by convergence. In quoting creationist A. C. Custance, Armstrong noted that "similar needs and purpose often lead to similar features." Comparing the eyes of an octopus and human eyes, Hamilton (1987, pp. 82-85) said that obviously the former's eyes were designed for a water-dwelling creature. He outlined the similarities and differences between the octopus and human eyes and concluded that they were designed to satisfy the needs of each and convergence is not a necessary explanation.

Using thermoregulation in the sphinx moth as an example, Armstrong (1972, p. 181) attacked the concept of convergence as an explanation for various forms of thermoregulation. In a brief survey of insect flight as a product of convergence, Butt (1980, p. 195) stated:

> Creationists . . . can view the great variety of methods of flight among insects as evidence of the Creator's skill, in giving His creatures equipment to make them fit for the style of life to which He assigned them.

A. J. Jones (1982, pp. 161-62) in a discussion of the concepts of homology and convergence, claimed that they indicated a Designer. The reader is urged to consult the work of Frank L. Marsh (1969, pp. 22-23) for a discussion of the common ancestor concept, resemblances and Genesis kinds as well as homologous structures, convergence and adaptive radiation. Marsh carefully outlines the areas where creationists and evolutionists can agree on resemblances and where disagreement occurs.

Design in Other Quarterly Writings

E. N. Smith (1975, p. 54), writing on body temperature regulation in reptiles, birds and mammals, noted that "God created all animals equally fit to live in their respective niches." Later in discussing how beetles keep warm or cool, he (1976, p. 68) stated ". . . all animals were created equally well adapted to their particular environment."

In discussing termite defensive systems, Ettari (1977, pp. 35-37) believed that evolution was not the answer, only creation could explain their origin. Armstrong (1978, p. 69) commented on an insect defensive countermeasure:

> Certain arctiid moths, which bats evidently hunt with the help of their radar (or, rather sonar) produce sounds, which are believed to confuse the echoes which return to the bats.

In a recent book written for laymen, Duane Gish (1990, pp. 96-101) discussed the amazing, fine-tuned

defensive mechanism of the bombardier beetle. He painstakingly explained how such an apparatus could not have evolved but must have been designed fully functioning.

Lammerts (1980, pp. 185-87) stated that Darwin never understood the functions of horns in beetles (thinking they had no usefulness except to attract or impress females). Using several examples, he outlined the purposes of horns of five beetles in the family Scarabaeidae. Lammerts (1985, pp. 196-97) also marveled at the relationship between *Dioclea megacarpa,* a legume and its only predator, a beetle *Caryedes brasiliensi,* an evidence of design. Recently Sanders and Howe (1986, pp. 166-70), while working at the Grand Canyon Experiment Station, discussed many features of insects that indicate creation. Also see Wells (1988, pp. 209-10) and Howe and Sanders (1988, pp. 210-13). Creationists in general conclude that many features in nature could have originated only by intelligent design and preplanning. Chance events offer no help for the complex subject of origins, for it is not a creator of order.

Food

It appears that *O. ornatus* eats mainly ". . . dead organic material (often including bark of desert shrubs), as well as moist soil" (Crawford and Wooten, 1973, p. 1). See Figure 13. Wallwork (1982, p. 42) noted that possibly the millipede may eat algae that often cover the soil in shaded areas of the Chihuahua desert. Smith (1982, p. 27) suggested that since the myriapod ingests soil it ". . . may have an ecological role in conditioning desert soils." Crawford and Wooten (1973, p. 15) believed that the intake of moist soil is necessary for the ". . . ingestion of dry *Ephedra* bark."

The bark and leaves of plants generally eaten (mainly dead material) are as follows: creosote bush, Mormon tea *(Ephedra* spp.), mesquite *(Prosopis* sp.), ocotillo *(Fouqueria splendens),* Russian thistle *(Salsola kali),* tumble weed *(Amaranths graecizans),* cholla *(Opuntia).* Other substances in the millipede diet are any type of dead and living plant tissue including superficial tissues of shrubs, new shoots of annuals and animal feces (Crawford and Wooten, 1973, p. 15). Crawford and Wooten emphasized that the animal has a considerable range of diet. The moisture needed in the millipede diet can be obtained from ". . . succulent leaves, cactus pads, fresh carrion and hygroscopic detritus" (Crawford, et al. 1987, p. 81). Was this organism designed to perform the function of digesting decayed plant matter and releasing the products as waste which can in turn be further digested by other organisms and eventually recycled back into the desert soil to be utilized by the existing flora?

Food and Defense Systems

Since millipedes can release many different noxious and toxic fluids against predators (Eisner et al., 1978, p. 52), it would make an interesting study to determine if diet has any effect on the type or amount of a particular substance emitted. Wolfrom (1990) noted an example where the type of food intake greatly affected a desert organism. Eisner et al. (1978, pp. 55-58) have considered this subject. They surmised ". . . that the animals are not dependent on obtaining preformed alkaloids from their food" (p. 56). However they noted that ". . . it is clear that some millipedes have biosynthetic capabilities which seem closely analogous to those found in plants" (p. 58).

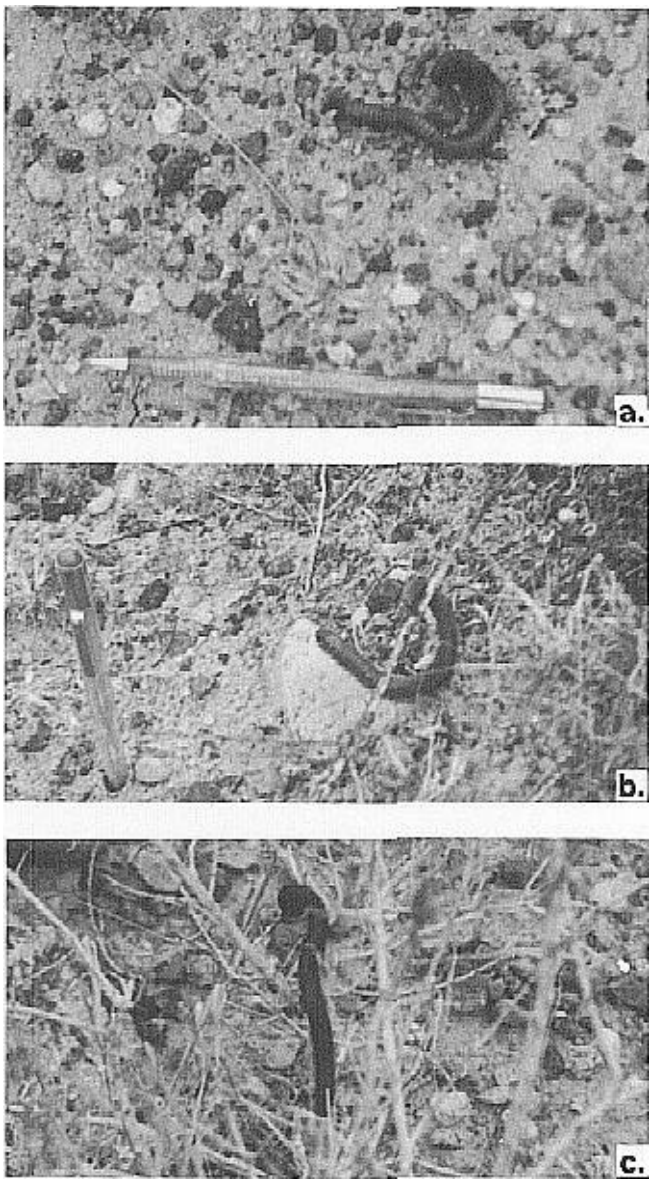


Figure 13. *O. ornatus* specimens foraging in Big Bend National Park—July 1990. a. Millipede eating decayed vegetation on desert floor; b. and c. Millipedes foraging on limbs of desert shrubs.

O. ornatus will feed upon dead and living *Larrea* tissue. It has been suggested that quinones might be one of the possible products formed by *Larrea* phenoloxidase upon the maceration of its leaves (Rhoades, 1977, p. 137). This statement was made within a discussion of the plant's production of secondary chemical substances as defense against herbivores. Can the millipede obtain the defensive fluids needed for its use from the plant matter it ingests or does it possess the necessary enzymes in its defensive system to form the fluids from the plant tissue it eats? Blower (1985, p. 33) stated that:

> Millipedes are not well equipped with specialized enzymes to enable them to digest the leaf

> material itself. It is suspected that they rely on the food material elaborated by the microorganisms in their bodies rather than the microbially degraded leaf material.

Some studies have been done on the digestive system of the myriapod. Nunez and Crawford (1976) claimed that digestive enzymes found in *O. ornatus* can hydrolyze *a*- and *b* -glucosides, *a*- and *b* -galactosides, starch cellulose, xylan, pectin, chitin, lipids and amino-tripeptides. Taylor (1982) reported the presence of 76 fungal species in the gut regions of the millipede. Crawford, Minion and Boyers (1983) detected three bacterial morphotypes, fungal mycelia and thelastomatid nematodes in the hindguts they examined.

Do the relative amounts of the two known quinones in the defensive fluids of *O. ornatus* change with diet? Do certain plants and animals both repel predators by emitting or forming quinones when they are "under attack"? Did the Creator use a similar template or logic when He designed the defense systems of desert-dwelling fauna and flora?

Locomotion

Statements can be read to the effect that millipedes are clumsy compared to centipedes (Holland, 1990. p. 129). While eating lunch one day at the picnic tables at Castolon store in Big Bend National Park in July 1990, the authors watched a millipede move across the porch of the store, climb up the vertical exterior wall without any hesitation (Figure 14) until its progress was halted by the gable of the roof. Then it returned vertically down the wall proceeding elsewhere. After this observation, no one will ever convince us that *O. ornatus* is clumsy. The animal never slipped, stumbled or appeared to be in danger of losing its grip. Watching the leg motion pattern is a study in excellently coordinated multi-legged locomotion. Burton and Burton (1989, p. 1613) noted that when millipedes walk ". . . each leg is a little out of step with the one in front so [that] waves appear to sweep back along each side of the body." Alexander (1987, p. 354) stated that Myriapoda move their legs

> . . . with beautiful regularity. Waves of leg movement seem to travel backwards or forwards. The appearance is due to the legs of a segment moving immediately after . . . or immediately before . . . those of a preceding segment.

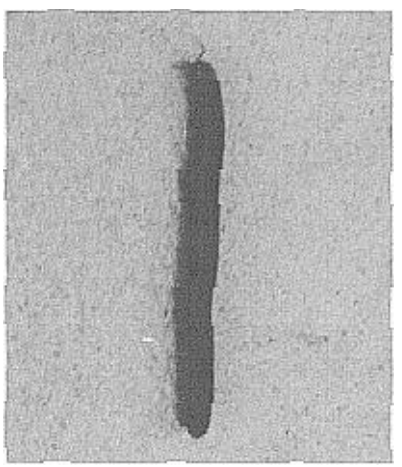


Figure 14. *O. ornatus* climbing a vertical wall—Big Bend National Park—July 1990.

In the same book, Schone (1987, p. 433) in discussing an animal's ability to orientate without external cues (kinesthetic orientation) noted:

> Another example of such a system is the correcting behaviour shown by a millipede when an obstacle obstructs its course. After a detour, the millipede resumes its previous course obviously using information registered when deviating from the original course to negotiate the obstacle.

Certain millipedes even can hop (Evans and Blower, 1973, pp. 427-28) when disturbed.

If you compare the speed of a millipede to that of a charging bear or a flying bird or insect, you must admit that the millipede is slow however. From the design perspective, was it a mistake to create the millipede locomotion system (Figure 15) in such a manner as to allow only for a slow-moving gait?

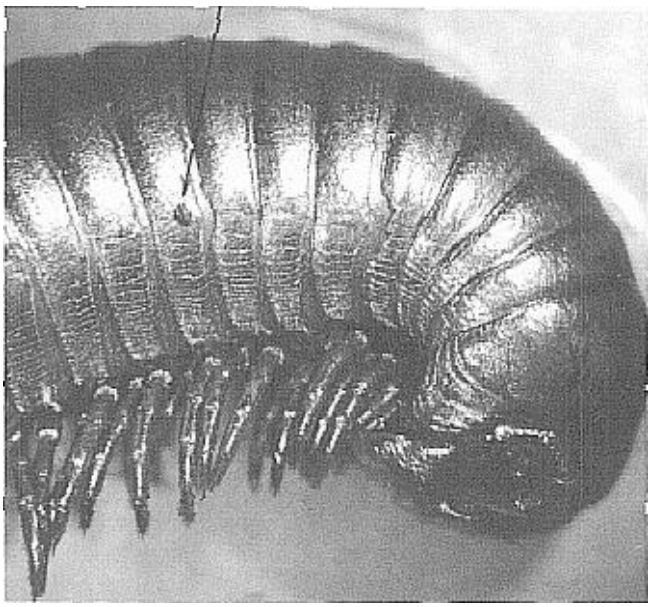


Figure 15. Scanning electron micrograph of gold-coated head and forward trunk portion of an *O. ornatus* exoskeleton showing two pairs of legs per segment in trunk. Exoskeleton found at base of Reed Plateau near Terlingua, TX—July 1990. Arrow indicates a clogged orifice where millipede can release its defensive fluid. Magnification-6.6X. Photomicrograph by R. R. White

The analysis of the locomotion of millipedes as well as other arthropods was accomplished in a series of papers by the late Dr. S. M. Manton of the British Museum of Natural History. A summary of these papers can be found in Manton (1977) and references to the individual papers are on pages 511-12. Manton (1977, p. 32) explained the necessity of slow movement for a millipede:

> A millipede which burrows like a bulldozer by the motive force of its legs . . . can only excel in those pursuits if it is slow-moving, strongly constructed; and possesses many legs so that force can be transmitted to the head end with the body-line curved in any position; it must also possess a host of other structural features. The same animal

> can never run fast and catch flies for a meal as can the highly advanced centipede *Scutigera* . . . with quite different morphology.

Manton developed these characteristics from the evolutionary viewpoint but we prefer the design concept. Consider another analogy. When one wishes to move dirt, a bulldozer would be employed for it has the power from its specialized engine and transmission as well as rugged construction to withstand the digging forces involved, and the track locomotion system to grip and push the equipment forward while under considerable stress. However one would never use a bulldozer in a drag race with a Corvette. Nor would one use the latter to move quantities of dirt. Each has been *designed* for a different task. The Corvette, with an engine and transmission built for fast starts and high speeds, light construction to reduce weight and a locomotion system of tires designed to reduce friction during travel, serves a different purpose than a dozer. Thus the millipede's locomotion system was designed for power, not speed. Can we say that to compensate for its relative slowness when feeding in daylight, the Creator endowed the organism with a defense system to repel some of its potential predators?

The millipede is agile for its function of moving across the desert soil and rocks, foraging up and down the limbs of desert shrubs clinging to them in all manner of positions (upright and upside down). The necessity of burrowing in soil when it must hibernate about three-fourths of the year in the dry and cold seasons in the desert may require the power of "bulldozing." Readers may be interested in consulting a brief creationist review (Lammerts, 1974) of some of Manton's writings on the evolution of Arthropoda.

Exoskeleton

The hard exoskeleton of *O. ornatus* serves the purpose of rugged construction when the need of burrowing arises. Likewise it can offer a possible deterrent to a predator when the millipede is in the defensive coiled position. Being offered nothing but a rigid spherical "shell," a predator may lose interest particularly after the quinones have been released.

The exoskeleton also serves another vital function—the resistance to water loss as the animal feeds in the hot desert. Crawford et al. (1987, p. 81) consider that *O. ornatus* has a relatively waterproof cuticle (Figure 16) which enables it to survive without rapid dessication (along with the animal's ability to take in water readily). An energy dispersive analysis (EDX) was conducted on the exoskeleton found at the base of the Reed Plateau. The remains were still brown in color indicating a fairly recent death. Calcium and phosphorus were the major constituents indicating the presence of calcium phosphate (oxygen is not detected with this EDX equipment). Traces of magnesium and sulfur were also found. See Figure 17. Both the legs and segments showed essentially the same composition.

Summary

Although Hadley (1973, p. 347) claimed that the processes of natural selection, diversification and specialization along with adaptation have allowed desert flora and fauna to survive the extreme conditions present there, we prefer the interpretation that *O. ornatus* was designed for this purpose.

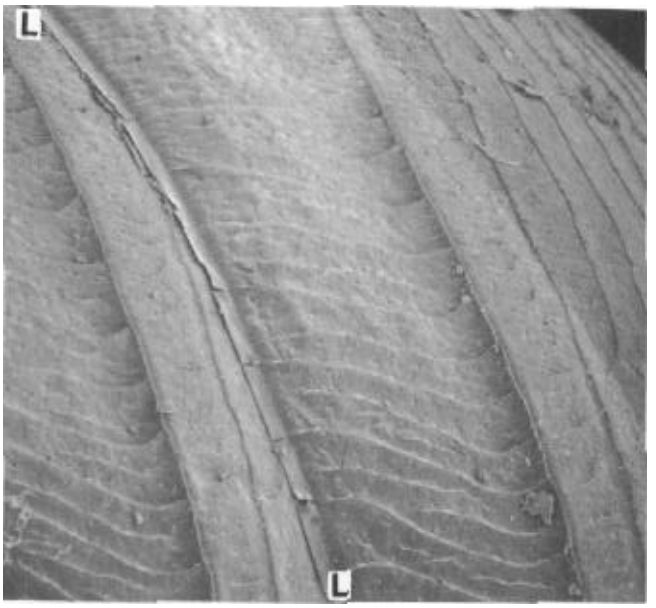


Figure 16. Scanning electron micrograph of gold-coated segments of *O. ornatus* exoskeleton. Note close fit where one segment overlaps another one (L). Magnification 36X. Photomicrograph by R. R. White

When several types of different organisms have the same pattern of adaptation, the explanation offered often is convergence (parallel evolution). We believe that the Creator could have used the same template, blueprint strategy or plan of design for different organisms to cope with a similar environment. A suitable solution to a foreseen survival problem is an indication to us of intelligence rather than the work of brute, undirected natural processes.

If *O. ornatus* was designed to be a "recycler" of dead plant matter in a desert environment, it appears that its structure, function and behavior patterns discussed in this paper can be explained within this design criterion. See Howe and Williams (1990) for a discussion of a desert plant survival potential within a design framework. If a reader is interested in other field studies done on *O. ornatus*, it is suggested that he consult the papers of C. S. Crawford. The fascinating study of defensive secretions emitted by arthro-

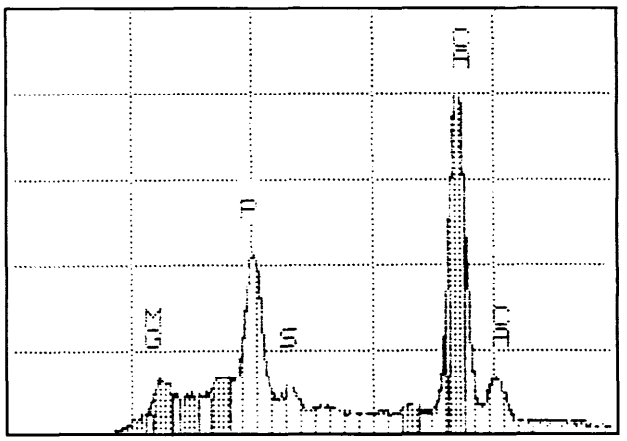


Figure 17. EDX analysis of *O. ornatus* segment and leg. Mg — magnesium, P — phosphorus, S — sulfur, Ca — calcium.

pods can be followed by consulting the articles of Thomas Eisner.

Acknowledgments

The authors thank the many donors to the Creation Research Society Research Fund, interest from which financed a portion of these studies. We thank Mr. Robert R. Sanders and Ms. Lazella Lawson for their help in the literature survey. The help of Dr. John R. Meyer in the 1988 Big Bend and 1990 Peach Springs Canyon field work is appreciated. Dr. Glen W. Wolfrom also aided in the 1990 Peach Springs Canyon work.

References

CRSQ—Creation Research Society Quarterly

Alexander, R. M. 1987. Locomotion in McFarland, D. editor. The Oxford companion to animal behaviour. Oxford University Press, New York.

Armstrong, H. L. 1971. Is convergence credible? *CRSQ* 7:232.

_____ 1972. Convergence in thermoregulation. *CRSQ* 9:181.

_____ 1978. Insects take countermeasures. *CRSQ* 15:69.

Barnes, R. D. 1968. Invertebrate zoology, second edition. W. B. Saunders. Philadelphia.

Barnes, R. S. K. et al. 1988. The invertebrates: a new synthesis. Blackwell Scientific. Palo Alto, CA.

Blower, J. G. 1985. Millipedes. The Linnean Society of London. London.

Buchsbaum, R. et al. 1987. The Audubon Society encyclopedia of animal life. Portland House. New York.

Burton, M. and R. Burton, editors. 1989. Millipede in the Marshall Cavendish international wildlife encyclopedia. volume 14. Marshall Cavendish. New York.

Butt, S. 1980. Insect flight: testimony to creation. CRSQ 16:195.

Causey, N. B. 1975. Desert millipede (spirostriptidae, spirostreptida) of the southwestern United States and adjacent Mexico. *Occasional Papers, The Museum, Texas Tech University* No. 35 (17 October).

Crawford, C. S., K. Bercovitz and M. R. Warburg. 1987. Regional environments, life history patterns, and habitat use of spirostreptid millipedes in arid regions. *Zoological Journal of the Linnean Society* 89:63-88.

_____, G. P. Minion and M. D. Boyers. 1983. Intima morphology, bacterial morphotypes and effects of annual molt on microflora in the hindgut of the desert millipede. *Orthoporus ornatus* (Girard) (Diplopoda: Spirostreptidae) *International Journal of Insect Morphology and Embryology* 12(5/6):301-12.

_____ and R. C. Wooten, Jr. 1973. The role of *Orthoporus ornatus* millipedes in a desert ecosystem. U.S. international biological program research memorandum 73–31.

Eisner, T., J. J. Hurst, W. T. Keeton and Y. Meinwald. 1965. Defensive mechanisms of arthropods. XVI. para-benzoquinones in the secretions of spirostreptoid millipedes. *Annals of the Entomological Society of America* 58:247-48.

_____ and J. Meinwald. 1966. Defensive secretions of arthropods. Science. 153:1341-50.

_____, D. Alsop, K. Hicks and J. Meinwald. 1978. Defensive secretions of millipedes in Bettini, S. editor. Arthropod venoms. Handbook of pharmacology. volume 48. Springer-Verlag. New York.

Ettari, V. A. 1977. The origin of termites. *CRSQ* 14:35-37.

Evans, M. E. G. and J. G. Blower. 1973. A jumping millipede. *Nature* 246:427-28.

Gertsch, W. J. 1990. Spiders and their kin. The new book of popular science. volume 4. Grolier. Danbury, CT.

Gish, D. T. 1990. The amazing story of creation from science and the Bible. Institute for Creation Research. El Cajon, CA.

Hadley, N. F. 1972. Desert species and adaptation. *American Scientist* 60:338-47.

Hamblin, W. K. and J. K. Rigby. 1969. Guidebook to the Colorado River. part 2: Phantom Ranch in Grand Canyon National Park to Lake Mead, Arizona-Nevada. Brigham Young University Geology Studies. volume 16, part 2. Department of Geology, Brigham Young University, Provo.

Hamilton, H. S. 1987. Convergent evolution—do octopus and human eyes qualify? *CRSQ* 24:82-85.

Holland, D. T. editor. 1990. Millipede in Encyclopedia Americana. volume 19. Grolier. Danbury, CT.

Howe, G. F. 1965. Homology, analogy and creative components in plants. *CRSQ* 2(1):14-19.

_____ 1967. The origin of the blue-green algae. *CRSQ* 4:100-105.115.

_____ 1975. Evolution–a problem in parallelism. *CRSQ* 11:219.

_____ and R. R. Sanders. 1988. A couple of insect errors but ample evidence for creation: a reply to Wells. *CRSQ* 24:210-13.

_____ and E. L. Williams. 1990. *Euphorbia antisyphilitica* (the candelilla plant) demonstrates providence, design and typology in creation. *CRSQ* 27:86-91.

Jones, A. J. 1982. A creationist critique of homology *CRSQ* 19:156-75.

Lammerts, W. E. 1974. Insect family tree may become a forest. *CRSQ* 11:124-25.

_____.1980. Horned beetles. *CRSQ* 17:185-86.

_____1985. A seed-eating beetle's adaptation to poisonous seeds. *CRSQ* 21:196-97.

MacMahon, J. A. 1987. Deserts. The Audubon nature guide. Alfred A. Knopf. New York.

Manton, S. M. 1977. The arthropoda: habits, functional morphology and evolution. Clarendon Press. Oxford.

Marsh, F. L. 1969. The form and structure of living things. *CRSQ* 6:13-25.

Nunez, F. S. and C. S. Crawford. 1976. Digestive enzymes of the desert millipede *Orthoporus ornatus* (Girard) (Diplopoda: Spirostreptidae). *Comparative Biochemistry and Physiology* 55A:141-45.

Rhoades, D. F. 1977. The antiherbivore chemistry of *Larrea* in Marby, T. G. et al. editors. Creosote bush. Douden Hutchinson. Stroudsburg, PA.

Sanders, R. R. and G. F. Howe. 1986. Insects indicate creation. *CRSQ* 22:166-70.

Schone, H. 1987. Orientation in McFarland, D. editor. The Oxford companion to animal behaviour. Oxford University Press. New York.

Shute, E. V. 1969. Square pegs in round holes or ridiculous "convergences." *CRSQ* 5:135-38.

Smith, E. N. 1970. Population control: evidence of a perfect creation. *CRSQ* 7:91-96.

_____ 1975. Body temperature regulation in reptiles, birds and mammals. *CRSQ* 12:54-58.

_____. 1976. How some beetles keep warm or cool. *CRSQ* 13:68.

Smith, R. L. 1982. Venomous animals of Arizona. Bulletin 8245. Cooperative Extension. The College of Agriculture. The University of Arizona, Tucson.

Taylor, E. C. 1982. Fungal preference by a desert millipede *Orthoporus ornatus* (Spirostreptidae). *Pedobiologia* 23:331-36.

Tiegs, O. W. 1957. Millipede in Encyclopaedia Britannica. volume 15. Encyclopedia Britannica, Inc. Chicago.

Wallwork. J. A. 1982. Desert soil fauna, Praeger. New York.

Wauer, R. H. 1980. Naturalist's Big Bend. Texas A & M University Press. College Station.

Wells, J. D. 1988. Creationist insect errors. *CRSQ 24:209-10.*

Williams, E. L. 1981. A creation model for natural processes in Williams, E. L., editor. Thermodynamics and the development of order. Creation Research Society Books. Terre Haute, IN.

Wolfrom, G. W. 1990. "You are what you eat." *CRSQ* 27:36.

QUOTE

The first polarity is between absolutism and teleology. Despite the philosophical objections which can and have been raised against grounding ethics in divinity, there can be no doubt that in the Old and New Testaments the reason certain acts, attitudes, and desires are considered wrong is because they are contrary to God's nature and consequent will for His creation.

Burke, Thomas J. 1986. The fundamental principles of Biblical ethics in Burke, Thomas J. (editor). *The Christian Vision: Man and Morality*. The Hillsdale College Press. Hillsdale, MI. p. 28.

THE CORRECT APPROACH TO SCIENTIFIC THEORIES*

APOSTOLOS CH. FRANGUS**

Received 3 August 1990; Revised 29 October 1990

Abstract

Intermixing of philosophical and metaphysical doctrines with empirical science poses an important problem, since such doctrines are often presented as scientific theories, which finally adulterates science itself. It is necessary to determine the criteria which distinguish science and metaphysical assumptions and therefore to evaluate the real essence and character of hypotheses and theories proposed as scientific ones. The problem appears in the explanation and interpretation of natural events. If the explanation offered is subject to a scientific test, then it is scientific. Otherwise, it is a philosophical or metaphysical assumption which cannot give any scientific knowledge. Empirical scientific testability is the only basis to determine and separate scientific theories from metaphysical adoptions.

Introduction

A very important problem appears in the empirical sciences when metaphysical and philosophical doctrines are involved. The identity of scientific data collected by scientific researchers with *a priori* metaphysical beliefs, distorts the character of empirical science and gives the impression that the conclusions derived accordingly are scientific facts. In this way, science becomes a means to propagate metaphysical doctrines and often political aims. It is necessary to emphasize this problem and make a sharp distinction between scientific evidence and data, and the philosophical and metaphysical adoptions of any individual scientist involved in scientific research. Such confusions decrease the objective validity of science.

Necessary Distinction

Although such a distinction is fundamental for true scientific progress, it is difficult to discern this intermixing. The strong inclination to understand the natural world on one hand, and on the other hand the limitations in knowledge of natural events, easily leads the researcher to intermix scientific findings with personal metaphysical and religious belief. This happens when the researcher interprets the data available to him. At this point is concentrated the whole problem. Science, in an empirical attempt to learn as much as possible about the natural world, uses our five senses.

Science is built upon several assumptions: Our self-consciousness, the order of the natural world, the validity of the laws of logic, and the validity of the law of universal causality. We assume certain principles that seem to require no proof, but are recognized through common sense since they are not subject to scientific tests (Frangos, 1986).

Restrictions

Science, in addition to the preceding basic principles, is also subject to some further limitations. Most of them have an objective character, that is, they exist independently of individual researchers. Some restrictions are: the methods used in scientific investigations (Popper, 1983); the inability to explain the origin of things by observation, the inability to deal with singularities, the limitation of measurements (Medawar, 1985, Trusted, 1979), etc. In addition, there is one further limitation which is subjective in character, and the most important. It is the dependence on the individual researcher and the possible intermixing of objective scientific findings with philosophical and metaphysical postulates. By such a confusion of scientific data with metaphysical indoctrination, science becomes not an objective research, but a means of propagating personal belief.

Interpretation of Data

Scientists not only try to describe natural events and their interactions, but also try to explain why events

*Editor's Note: Readers interested in previous discussions on a philosophy of science from the Quarterly may consult the following selected bibliography.

Ancil, R. E. 1985. On the importance of philosophy in the origins debate 22: 114-2.3; Armstrong, H. L. 1970. One faith against another faith. 6:189-90; 1974. On the distinction between religion, philosophy, science and history. 11:10-13; Barnes, T. G. 1964. Superiority of scientific approach that accepts its limitations and makes use of Scripture. 1(1):56; Bergman, J. 1983. What is science? 20:39-42; 1986. Metaphysics 22:203-204; Ferst, B. 1983. What Bible-scientists can learn from Bible-science. 20:116-20; Garrido, J. 1970. The theory of evolution and the limitations of human knowledge. 6:185-87; Hall, M. and S. Hall. 1984. Evolutionism is not science: period and paragraph. 21:155-56; Herrmann, R. A. 1984. The Word. 20:226-29; Holroyd, H. B. 1973. Natural theology is a scientific study. 10: 158-62; Howe, G. F. 1985. Keeping our models separate—Biblical creationism distinct from creation science. 22: 141-42; Ingram, T. R. 1974. Can there be true science without true religion? 11:6-8; Jones, A. 1971. The nature of evolutionary thought. 8:44-49; Klotz, J. W. 1966. The philosophy of science in relation to the concepts of creation vs. the evolution theory. 3(2):3-12; Kofahl, R. E. 1986. Correctly redefining distorted science: a most essential task. 23:112-14; 1989. The hierarchy of conceptual levels for scientific thought and research. 26:12-14; Korthals, R. G. 1965. There was evening—there was morning. 2(2):6-14; McGhee, L. A. 1980. Gracious science and interfering science. 17:110-1 1; 1982. Comments on "An estimate of the current status of evolutionary thinking" by John N. Moore. 19:195-96; 1987. The metaphysics of modern science. 24: 138-41; Mennega, A. 1972. A Christian biologist's reflections on the scientific method. 9:,30-31. Moore, J. N. 1971. On evolutionists and their cloak of ideas: a parallel. 8:76-77; 1974. Some definitional formulations. 11:3-5; 1982. An estimate of the current status of evolutionary thinking. 18:189-97; Morris, H. M. 1971. Proposals for science framework guidelines. 8:147-50; Myers, E. 1987. Aristotle and creationism: a comparison. 24:5-9; Ouweneel, W. J. 1971. The scientific character of the evolution doctrine. 8:109- 15; Riemen, W. P. 1987. The non-material hypothesis and its implications for modem science. 23: 141-45; Schoepflin, G. L. 1972. On assumptions and their relation to science. 9:12.5-29; Smith, B. A. 1985. Science and Scripture. 22:96-97; Tinkle, W. J. 1976. The reign of law. 13:44-46; Wiant, Jr., H. V. 1972. A philosophical note on creationism. 9:171, 198; Williams, E. L. and G. L. Mulfinger. 1974. A Biblical framework for a course in physical science. 11:8-10; Williams, E. L. 1976. A creation model for natural processes. 13:34-37; Wolfrom, G. W. 1975. Evolution, science and religion. 12:84-88.

**Apostolos Ch. Frangos, BS, BA, 43 Ellanikou Street, Athens 11635, Greece.

happen. Explanations usually are attempted by hypotheses, formulated to give a deeper understanding both to a single natural event and also to the natural world as a whole.

To explain a natural event, we must be able to describe the causal mechanisms which are responsible for it (Powers, 1982; Bohm, 1984). Nevertheless, it is not always possible to proceed deeper into the natural events beyond boundaries raised by the existing scientific restrictions. Instead of accepting the limitation, many scientists intermix scientific data with their metaphysical assertions. As a result, the same data may be interpreted in equally different logical ways (Harre, 1983). The same event may be given different, equally attractive explanations, while neither can be proved or falsified scientifically.

An example occurs in the theory of evolution. The same data can also be interpreted within a creationist framework. The theory of evolution, like many other theories, depends not on the reliability of the data used, but on the subjective interpretation given within the metaphysical assumptions held by the researcher. Clearly, reported data and human knowledge are not the same thing. Data do not speak for themselves: they must be interpreted. They often say what the individual wants them to say. This is why the theory of evolution is not a true scientific theory.

Regarding the argument that the naturalistic explanation is scientific and the creation approach is religious, it must be emphasized that the determination of a theory as either scientific or religious, does not depend on the assumptions used (natural mechanism or supernatural), but on the testing of the theory in a scientific empirical way.

Conclusion

If a theory is not subject to an empirical scientific test, then it is not scientific and it is outside of the domain of science. It is beyond human capability to verify or falsify it, or to give any scientific reply. I therefore believe that creationists should not try to oppose evolutionary theory with a scientific creation model. Instead, we must interpret all available data on the basis of the Creation doctrine in Scripture. It is unacceptable to let evolutionists deceive mankind by presenting their metaphysical/religious adoptions as scientific fact.

We must keep in mind that neither evolution nor creation models are true scientific models. They are metaphysical explanatory propositions, and the acceptance of one or the other depends upon the preference of each individual person and not on objective scientific conclusions, even if they are presented as tentative. This should be an important message that creation science offers. It has an immediate priority to separate each person from his illusive prejudices, and hence to gain the freedom of his thought.

References

Bohm, David, 1984. Causality and chance in modern physics. Routledge and Kogan Paul. London.

Bunge, Marie, 1984. Causality and modern science, Dover Publications. New York.

Frair, Wayne and Persival Davis. 1983. A case for Creation. Moody Press. Chicago.

Frangos, Apostolos. 1986. The great delusion. Proceedings of the First International Conference on Creationism. Volume I. Pittsburg, PA pp. 49-51.

Harre, R. 1983. The philosophies of science. Oxford University Press. London.

Medawar, Sir Peter. 1985. The limits of science. Oxford University Press. London. pp. 59-86.

Popper, Karl. 1983. The logic of scientific discovery. Hutchinson. London.

Powers, Jonathan. 1982. Philosophy and the new physics. Methuen. London. pp. 41-43.

Trusted, Jennifer. 1979. The logic of scientific inference. The Macmillan Press. London.

SYMPOSIUM ON VARIATION—IV**

A REFINEMENT OF BIOSYSTEMATICS WHICH REFLECTS BARAMINIC VARIATION

PAUL A. BARTZ*

Received 1 October 1990; Revised 12 November 1990

Abstract

Life on earth exhibits discrete gaps between kinds of creatures supportive of the creationist position. But life also displays variation, a trait which has traditionally, but incorrectly, been seen as supportive of the evolutionary interpretation. A combination of these and other factors, notably the remarkable creativity in the use of traits, sometimes without an apparent organizing system, makes biosystematics difficult for both the creationist and the evolutionist. Creationists may now be poised to offer the first truly objective biosystematics which is acceptable to both sides of the origins debate. Such an eventuality would radically change the nature of the origins debate.

Introduction

Biosystematics has been a problem area for both creationists and evolutionists ever since taxonomists first tried to group systematically the prodigious diversity of life on earth. Biosystematics would face an entirely different set of problems if there were a smooth and imperceptible gradation between living things, as would be expected by the evolutionary interpretation of nature. That problem does not exist.

Gaps and Variations

Life, both living and fossil, displays distinct gaps which invite the effort of classification. However, biosystematics is complicated by the almost unbounded

*Paul A. Bartz, M.Div., Communications Director of the *Bible-Science Newsletter*, Bible-Science Association, P.O. Box 32457, Minneapolis, MN 55432.

**Parts I-III are in *CRSQ* 27:144-153.

creative applications between living things. Creatures which are clearly unrelated can have similar characteristics while creatures which seem to be closely connected differ from each other in some crucial characteristics. Birds, mammals, reptiles, insects and fish have all developed forms of flight. Some fish bear live young while the platypus lays eggs. Some reptiles carefully nurture their young. The colugo was first classified as a reptile, then as a primate mammal and finally was given its own classification. The realities of the biological world complicate the task of classification.

While creationists can take comfort in the fact that life displays discrete gaps between kinds, it is also clear that the kinds within these discrete populations show the annoying (to the taxonomist) characteristic of variation. It is this tendency toward variability which provides the basis for evolutionist extrapolation. Undaunted by the fact that no evidence exists that this variation is unlimited, and repeated evidence that genetics operate under principles of conservation, evolutionists extrapolate a single cell-to-man biological continuum. The search for the missing portions of that continuum takes place in the fossil record.

The fossil record has proven largely meaningless in the search to establish unlimited biological change. When proponents of unlimited biological malleability find two similar fossils they tend to depict the stratigraphically older fossil as a biological antecedent to the later specimen. The question of whether the two specimens are in fact not “parent” and "child," but "cousins." and thus demonstrate nothing about any proposed evolutionary history is never considered unless the resulting conclusions challenge a prior established "relationship?" Nor could this question be considered since there is no methodology for defining the difference or testing either conclusion.

Likewise, alleged “modern” and “archaic” physical traits are attributed haphazardly, without defined methodology, in order to establish relationships which facilitate further theorization toward unlimited biological variability. Only a trait which has been separately viewed and its characteristics and functions traced through time and range of manifestations can be placed on a supposedly infinitely-graded scale from “archaic” to “modern.” Yet, until “archaic” and “modern” are defined, no scale can be defined. The only solution to this apparent paradox appears to be circular. When one factors in the inability to determine the difference between possibly evolutionarily significant “parents” and “children” and evolutionarily meaningless “cousins” there appears to be no solution to the problem of determining “modern” and “archaic” traits within the rules of normal science and logic. Yet herein lies the bulk of the argument for evolutionary change. Further arguments from homologies become a second-level exercise, resting on no foundation.

The Subjective in Evolutionary Taxonomy

This state of affairs underlies the current situation in which neither creationists nor evolutionists can offer an objective set of criteria to guide the biosystematic task. Even the evolutionary definition of a “species” suffers from both subjectivity and non-correlation with reality. A “species” has somewhat universally been defined as a population which frequently or occasionally breeds with one another and has an even range of gradation in their characteristics. However, reproductive isolation is not easy to define (Marsh, 1972; Lester and Bohlin, 1984). Worse, creatures which are virtually morphologically indistinguishable and may produce fertile offspring under laboratory investigation may practice complete reproductive isolation in nature (Marsh, 1972).

Some of the lack of focused effort in developing a creationist systematics undoubtedly arises from the apparent success of evolutionist claims that the fossil record better supports the evolutionist scheme of first appearances than the creationist zonation burial (Flood) model. However, Wise (1990) has rigorously demonstrated that the creationist zonation model is at least as predictive of the fossil order of plant phyla and arthropod classes, based on a cladistic approach, if not more so, than the evolutionist first appearance model. At the very least, his work shows that the actual fossil deposition pattern is equally explained by randomness as it is by proposed evolutionary phylogeny. It did not help creationists when John Ray and later, Linnaeus, both creationists, defined the Genesis “kind” so narrowly as to virtually equate “species” with the Genesis “kind” (Marsh, 1972). Creationist writers, starting with Marsh rejected these older, narrower views (Marsh, 1972; Lester and Bohlin, 1984; Moore and Slusher, 1981; Jones, 1982).

There is no question among creationists today that biological variation is a reality. Yet creationists are willing to allow for variation only within limits. This is not to say that creationists believe that God acts in a capricious manner. Rather, creationists expect God to act according to the limits He Himself has instituted. This qualification is important since it holds creationism within the limits of classical science (Klaaren, 1977). That God is not personally bound by these laws, which science endeavors to discover, is evidenced by Biblical miracles. Miracles would have no meaning without the usual operation of definable laws. If the world operated capriciously, miracles could not be signs for His purpose.

This does not mean that God regularly and silently causes breaches in the laws He has established, including the laws of biological variation. Creationists do not suspect that God quietly instituted a new ability in certain microbes to resist penicillin after it came into widespread use. Rather than suspecting that new genetic information became inherent in these microbes, as did some evolutionists, creationists can interpret this resistance as being within the original created range of the bacteria involved.

This contrasts sharply with the unlimited nature of variation proposed (and required) by evolution, which itself almost seems to interject caprice into natural law. As Erasmus Darwin wrote in *Zoonomia,*

> Would it be too bold to imagine that all warm blooded animals have arisen from one living filament which the great First Cause endued with animality, with the power of acquiring new parts, attended with new propensities, directed by irritations, sensations, volitions and associations; and thus possessing the faculty of continuing to improve by its own inherent activity, and of deliver-

ing down those improvements by generation to its posterity, world without end (as quoted in Mason, 1962).

Creationist Efforts at Biosystematics

In 1941 Marsh attempted to recognize the fixity of kinds as well as the reality of genetic variability by proposing the term "baramin," which has come as close as any term to having a common usage and definition among creationists. Meaning literally "created kind," a practical definition for "baramin" remains elusive. Marsh's original definition which places all creatures which can produce fertile offspring into the same baramin (Marsh, 1972) has been challenged by other creationists as "simplistic" and rejected as inadequate because it offers no explanation for why this is so (Lester and Bohlin, 1984).

In its place, Lester and Bohlin (1984) proposed the term "prototype," But they, too, must admit that it is not easy to offer a definition for "prototype" which has a meaningful biological application. They offer that a "prototype" encompasses "all organisms that are descended from a single created population." Wisely, Lester and Bohlin reject all attempts to equate "prototype" with "species" or taxa.

Lester and Bohlin suggest a number of methods for identifying a "prototype," admittedly not all of which are traditional taxonomic criteria. Their suggestion is a significant contribution in defining the problem of identifying the range and limits of biological diversity. Their criteria include morphology, embryology (to determine the role of regulatory mechanisms), chromosome morphology, structural genes, and regulatory mechanisms. As this list suggests, we actually know very little about the living things we are attempting to classify. Ultimately, this lack of knowledge is our primary hindrance in developing a taxonomic system that works.

Baraminic Taxonomy

This suggests that at our current stage of knowledge about the living world, any proposed system of classification must allow for that lack of knowledge. Just such a system may have been proposed at the 1990 International Conference on Creationism. The system proposed by ReMine (1990) under the name "discontinuity systematics" assumes discrete kinds, yet is open-ended in allowing for as much biological variation as can be demonstrated. Discontinuity systematics is limited to classifying only known organisms. The goal is to develop groupings which can be defined relative to other life forms. Four groupings are suggested.

The "holobaramin" is "a complete set of organisms related by common descent," This is reminiscent of Lester and Bohlin's "prototype."

The "monobaramin" is a smaller group of organisms which is related by common descent, but need not include all organisms related within the same common descent.

The "apobaramin" contains all the ancestors and descendants of any of its members and can contain one or more holobaramins.

A "polybaramin" is a group of organisms which do not share a common ancestor, and so necessarily contains members of more than one holobaramin.

Membership in any of these is determined by a number of criteria including lineage, reproductive viability, a number of similarity criteria, and experimentation. A number of critiques suggest themselves after reviewing ReMine's paper. If lineage criteria is to include fossil evidence, this criteria will suffer from the same "parent/child" versus "cousins" problem which currently inflicts evolutionary fossil interpretation. ReMine's criteria need to be reviewed in light of the criteria suggested by Lester and Bohlin.

It is suggested that while ReMine's suggestions require the usual discussion and refinement due any scientific proposal, they provide a direction for further discussion. There is no question that creationist systematics requires a refinement in terminology which is based on objective criteria which takes baraminic variability into account. Since the exceptions to the rules which define "species" continue to expand, creationists are well poised to recapture the scientific high ground.

References

Jones, A. J. 1982. The genetic integrity of the "kinds" (baramins): a working hypothesis. *Creation Research Society Quarterly* 19: 13-18.

Klaaren, Eugene M. 1977. Religious origins of modern science. W. B. Eerdmans. Grand Rapids. pp. 155-56.

Lester, Lane P. and Raymond G. Bohlin. 1984. The natural limits to biological change. Zondervan. Grand Rapids. pp. 156-75.

Marsh, Frank L. 1972. The Genesis kinds in the modern world in A challenge to education, Essays of the 1972 National Creation Conference. Bible-Science Association. Minneapolis. pp.77-84.

Mason, Stephen F. 1962. A history of the sciences. Macmillan. New York. pp.329-30.

Moore, John N. and Harold Slusher. 1981. Biology, a search for order in complexity. Zondervan. Grand Rapids. pp. 439-41.

ReMine, Walter J. 1990. Discontinuity systematics: a new methodology of biosystematics relevant to the creation model. Proceedings of the 1990 International Conference on Creationism. Creation Science Fellowship. Pittsburgh. (To be published.)

Wise, Kurt P. 1990. Ecological zonation and the first appearance of higher taxa. Proceedings of the 1990 International Conference on Creationism. Creation Science Fellowship. Pittsburgh. (To be published.)

Perfectibility?

In a letter to Thomas Jefferson, John Adams asked the following questions:

> Let me now ask you, very seriously my Friend, Where are now in 1813, the Perfection and perfectibility of human Nature? Where is now, the progress of the human Mind? Where is the Amelioration of Society? Where the Augmentations of human Comforts? Where the diminutions of human Pains and Miseries . . . ? When? Where? and how? is the present Chaos to be arranged into Order? (Taylor, 1969, p. 26)

These are still good questions today. The "evolutionary" trend toward perfection simply does not exist.

Reference

Taylor, W. R. 1969. *Cavalier and Yankee: The Old South and American National Character* Harper and Row. New York.

SYMPOSIUM ON VARIATION–V

ORIGINAL KINDS AND TURTLE PHYLOGENY

WAYNE FRAIR*

Received 20 September 1990; Revised 26 November 1990

Abstract

Creationist biologists have discussed and made limited progress toward understanding various extinct and extant forms of life within a discontinuous (or baramin) model. As an example, the turtle appears abruptly in the fossil record. Among the various scientific approaches directed at understanding possible turtle diversification has been biochemistry in which serum proteins primarily have been utilized. A challenge is given for systematics researchers to investigate nature utilizing a baramin concept.

Introduction

A goal among creationist biologists has been an understanding of fauna and flora with regard to the basic "taxonomic" groupings to which they belong. This systematic viewpoint is stated concisely in the constitution of the Creation Research Society, namely that:

> All basic types of living things, including humans, 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. Article II—Statement of Belief, Section 2.

The word "kind" is a translation of the Hebrew *min* used by the inspired author of Genesis as well as other authors of Biblical books. It commonly is understood to refer to the basic plant and animal groupings found in nature (see Payne, 1958; Jones, 1972 a, b). These groups would not be related physically by descent from common ancestry with other groups. Rather each would constitute its own genetic entity since each is a separate creation of God. The systematic position is a *discontinuity model* (ReMine, 1991) which is characterized by a forest of trees—each tree being a "kind" with living organisms at tips of all the branches. The macroevolutionary model, on the other hand, is a continuity model in which all living animals and plants would be found at tips of branches of a single large tree.

Terms proposed for the basic (Genesis) kinds include baramin (from the Hebrew *bara,* create plus *min,* kind), (Marsh, 1941) and prototype (Lester and Bohlin, 1989). The former word has become increasingly popular, and recently a new systematic methodology called baraminology has been proposed for approaching an understanding of all nature with a discontinuity model (Wise, 1991).

Turtles and Serology

During the past 30 years I have been involved in a comprehensive biochemical study of all types of turtles for the purpose of understanding their diversification. These studies have involved use of serum proteins. However, for two years I did engage in hybridization of erythrocytic DNA from several turtle types. Results showed that the DNAs compared were quite similar (Frair, 1967). I think that systematic interpretation of results from nucleic acid experiments are far more difficult to understand (for example because of introns, "pseudogenes," etc.) than are those utilizing proteins from adult organisms. My choice has been the serum proteins, all of which circulate through all organs of the body. Some studies have involved only single proteins such as the relatively small protein, albumin (for example, Mao et al., 1987; Yin et al., 1989). It can be advantageous to compare smaller proteins because they are not as likely to experience changes as are larger proteins, but I still consider that those projects having the greatest taxonomic and systematic value utilize multiple proteins.

My methodologies have involved electrophoresis and various immunological procedures, mostly quantitation of precipitation in fluid, semifluid and solid media (Frair 1985a). Some of my early studies demonstrated that chelydrids (snapping turtles) unexpectedly are more like emydids than like kinosternids, that the Mexican *Staurotypus* was like *Dermatemys* (a kinosternid), that all five types of sea turtles, including the leatherback, *Dermochelys,* were quite close, and that softshell turtles were distinct from most other types (Frair, 1964).

These conclusions have been extended and confirmed by later projects—the position of chelydrids, of *Staurotypus* and *Dermatemys* (Frair, 1972), unity of sea turtles (Frair, 1969, 1979, 1982c; Frair and Prol, 1978), the position of softshells among turtles (Frair, 1983b). A later broad survey which included softshells still showed them to have distinct proteins, and another distinct type of turtle, the plateless river turtle, *Carettochelys,* from New Guinea and Australia, was most like certain softshells (Frair, 1985c).

Other biochemical studies have involved the sideneck turtles (Pleurodira) from South America, Africa, Madagascar, and Australia. There is a stock of *Podocnemis* in South America; and one of these species was removed to the genus *Peltocephalus* and the one Madagascar *Podocnemis* to *Erymnochelys* (Frair et al., 1978; Frair, 1982b). A very distinct South American sideneck, *Hydromedusa,* shows some likeness to Australian forms. Both genus *Emydura* and *Chelodina* from Australia share serum protein similarities with South American Shelids. So it appears that forms in South America and Australasia did not diverge in isolation (Frair, 1980).

While there are many species of turtles in North America—southeast U.S. being one of the best places

*Wayne Frair, Ph.D., The King's College, Briarcliff Manor, NY 10510, is President of the Creation Research Society.

in the world to find a diverse turtle fauna—aquatic habitats in northern Europe (as in France and Germany where many human American families have originated) have only one living endemic species, the European pond turtle, *Emys orbicularis.* Protein studies indicate considerable similarity between this form and the North American Blanding's turtle *Emydoidea blandingi* (Frair, 1982a; Seidel and Adkins, 1989).

Some batagurin turtles are common in Asia but not in North America. Evidence suggests that batagurins may be closer to a basic turtle ancestry than are emydins (like *Emys* and *Emydoidea).*

It could be that land turtles (tortoises) and the European *Emys* originated from Asian ancestry. The turtle with serum proteins most like *Emys* is the American *Emydoidea* which could have shared close ancestry with *Emys* and then in the United States diversified to produce a complex of turtles including the wood turtle, spotted turtle, bog turtle, box turtles and western pond turtles (Frair, 1982a, 1985 a, b).

Turtle Origin(s)

With regard to the initial origin of turtles, fossilized remains have been discovered in various regions of the world. Some of these greatly exceed in size even the largest type living today which is the giant leatherback possibly weighing 600 kg (1320 lbs). Fossilized turtles testify to a far greater chelonian diversity than is found today, but the first turtles, as evolutionist Pritchard (1979a) has noted, "shed little light on the evolution of the order Testudines from its presumed cotylosaurian ancestors" (p. 73). The first turtles, although differing in some features from extant forms, clearly were turtles. In his treatment on the "Origin of Reptiles" evolutionist Carroll (1969) said:

> The earliest and most primitive turtles, placed in the suborder Proganochelydia, are known from the Upper Triassic of Germany. Descriptions of these forms, by Jaekel (1916) and others, indicate that they are already unquestionably turtles in most features of their anatomy and show little, if any, affinity with other groups of reptiles . . . At present the ancestry of turtles is subject to considerable speculation (p. 9).

In 1939 the Sri Lankan scientist, P.E.P. Deraniyagala, published a drawing of his conception of a "missing link" leading to turtles. He termed it "The Saurotestudinate," a scale-covered lizard-like creature which he described as:

> probably a slow-moving, tooth-jawed [all extant turtles lack teeth] marsh dweller, which originally arched its back and attempted to hide its head by humping its shoulders as do many living burrowing frogs when alarmed (p. 26).

He conceived of it as possessing some leatherback features. But Mlynarski pointed out, as noted by Pritchard (1979b) regarding Deraniyagala's turtle evolution concept, "there is no fossil evidence to support this hypothesis"(p. 5).

For decades it was held that the South African *Eunotosaurus* represented an ancestral chelonian, but especially since the 1960's it has become increasingly clear that this form is not a missing link between cotylosaurs and turtles but rather a deviant cotylosaur (see Carroll, 1969; and Pritchard, 1979a,b).

Also see evolutionist Obst (1988), who discusses *Eunotosaurus* as well as the Placodontia, both of which he refers to as turtle "imposters" whose similarities to turtles are believed by evolutionists to represent convergence. Obst speaks of turning to "conjecture" in searching out turtle origins.

Evolutionist E. S. Gaffney, a leading world expert on fossil turtles, refers to the turtle as "God's noblest creature" (Gaffney and Meylan 1988, p. 161) -- the first being *Proganochelys* with its fully formed shell (Gaffney and Meeker, 1983; Gaffney and Meylan, 1988; Gaffney, 1990; see Figure 1). Gaffney and Meylan (1988, p. 160) point out that efforts have been made to discover turtle ancestry, but there is no consensus. Halliday and Adler (1986) also reflect that the turtle with its fully formed shell appears abruptly in the fossil record.

All the authorities referred to above believe that turtles evolved from some ancestry, even though it is not clear what this is. They are quick to point out, however, that the first turtle differs from modern forms. There has been considerable diversification which has produced some extinct fossil turtles and the present 250 living species of turtles. I want to acknowledge that any lack of agreement or uncertainties among authorities regarding turtle phylogeny does not necessarily prove that God created *Proganochelys* or any other turtles. However, available evidence is consistent with an abrupt appearance of a turtle kind as exhibited by *Proganochelys.*

If *Proganochelys* is not related by descent from some unknown terrestrial ancestor, then it would have been engendered either by some *natural* (cosmic?) process or by *supernatural* intervention. Either of these alternatives is preferred on the basis of an investigator's "world view" including the presupposi-

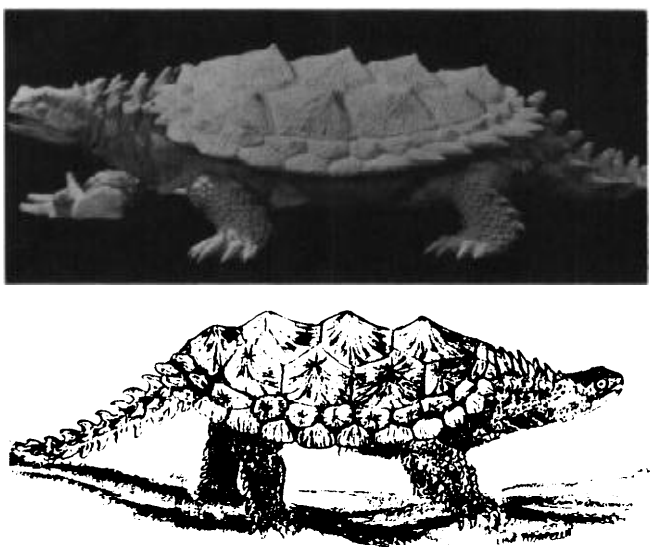


Figure 1. Upper. Life restoration of *Proganochelys quenstedti* sculptured by David Dann. This animal is "roughly comparable" in size, morphology, and possible habitat to *Macroclemys temmincki*, the living alligator snapping turtle (see Gaffney, 1990, p. 25). Photograph supplied by Eugene S. Gaffney.
Lower. Artist Lisa Pizzarella's conception of the same specimen in a more active position.

tions with which a study of nature is approached and conclusions drawn. For me the supernatural perspective is logical and satisfying.

There are two main types of turtles—the straight necks, Cryptodira, and side necks, Pleurodira. If turtles belong to a monotypic baramin, perhaps *Proganochelys* is the closest ancestor for both of these groups. This is my present viewpoint. A few years ago I suggested that possibly turtles constituted a polytypic baramin with as many as four diversification lines (Frair, 1984). Even though this is not my current position, I still consider it a reasonable hypothesis worthy of further consideration.

For the best understanding of variation which has ensued within baramins we need multiple approaches which include morphological (macroscopic, microscopic and molecular), physiological, behavioral, etc. studies. The various biochemical investigations utilizing proteins and DNA may be thought of basically as "comparative anatomy" at the level of molecules—molecular morphology. These types of studies have aided in our conceptions and reconstructions of the history of turtle diversification.

If indeed a "kinds," that is, a baramin concept, is to be preferred by systematists—and *there is* strong evidence that it is the best working hypothesis (mainly because of the discontinuities between fossil groups and also between living groups) —then creationists and other scientists need to take more seriously the challenge of studying the various plant and animal groups from this perspective.

There have been efforts to encourage the scientific community to think and to research on the basis of "kinds" (see Frair, 1958, 1983a, 1984; Jones, 1982; Lester and Bohlin, 1989; Marsh, 1941, 1976, 1978, 1981, 1982, 1987; Siegler, 1974, 1978, 1983). A new impetus has been provided recently by ReMine (1991) and Wise (1991). The future of the creationist movement within the scientific community very well could depend upon whether this challenge is accepted seriously by creationist researchers.

References

CRSQ—Creation Research Society Quarterly.

Carroll, R. L. 1969. Origin of reptiles. In Gans, C., A. d'A. Bellairs and T. S. Parsons (editors). Biology of the reptilia. Volume 1. Morphology A. Academic Press. New York. pp. 1-44.

Deraniyagala, P. E. P. 1939. The tetrapod reptiles of Ceylon. Volume 1. Testudinates and crocodilians. *Ceylon Journal of* Science. Colombo Museum of Natural History Series. Dulau and Company. London.

Frair, W. 1958. What are the scientific possibilities for original kinds? *Journal of the American Scientific Affiliation* 10(1):12-16.

_____ 1964. Turtle family relationships as determined by serological tests. In Leone, C. A. (editor), Taxonomic biochemistry and serology. Ronald Press. New York. pp. 535-44.

_____ 1967. Some molecular approaches to taxonomy. *CRSQ* 4:18-22, 47.

_____ 1969. Aging of serum proteins and serology of marine turtles. *Serologic Museum Bulletin* 42:1-3.

_____ 1972. Taxonomic relations among chelydrid and kinosternid turtles elucidated by serological tests. *Copeia* 1972(1): 97-108.

_____ 1979. Taxonomic relations among sea turtles elucidated by serological tests. *Herpetologica* 35(3):239-244.

_____ 1980. Serological survey of pleurodiran turtles. *Comparative Biochemistry and Physiology* 65B:505-511.

_____ 1982a. Serological studies of *Emys, Emydoidea* and some other testudinid turtles. *Copeia* 1982(4):976-978.

_____ 1982b. Serological studies of the red turtle, *Phrynops rufipes. HERP Bulletin* of *the New York Herpetological Society* 17(2):4-9.

_____ 1982c. Serum electrophoresis and sea turtle classification. *Comparative Biochemistry and Physiology* 72B:1-4.

_____ and P. Davis. 1983a. A case for creation. Third edition. Creation Research Society Books, Terre Haute, IN.

_____ 1983b. Serological survey of softshells with other turtles. *Journal of Herpetology* 17(1):75-79.

_____ 1984. Turtles now and then. In Proceedings of the Northcoast Bible-Science Conference (28-29 June). North Coast Bible-Science Association (at Brook side Baptist Church). Seven Hills, OH. pp. 33-38.

_____. 1985a. A positive creationist approach utilizing biochemistry. In Science at the crossroads: observation or speculation? Onesimus Publishing. Richfield, MN. pp. 33-36.

_____. 1985b. Biochemical evidence for the origin and dispersion of turtles. In Proceedings of the 11th Bible-Science Association National Conference. Bible-Science Association, Minneapolis, MN. pp. 97-105.

_____ 1985c. The enigmatic plateless river turtle, *Carettochelys,* in serological survey. *Journal of Herpetology* 19(4):515-23.

_____ R. A. Mittermeier and A. G. J. Rhodin. 1978. Blood biochemistry and relations among *Podocnemis* turtles (Pleurodira, Pelomedusidae). *Comparative Biochemistry and Physiology* 61B:139-143.

_____ and B. Prol. 1978. Taxonomic study of the giant leatherback turtle *(Dermochelys coriacea).* Oehser, P. H. and J. S. Lea (editors). *National Geographic Society Research Reports 1969.* pp. 187-194.

Gaffney, E. S. 1990. The comparative osteology of the Triassic turtle *Proganochelys. Bulletin of the American Museum of Natural History Number 194.*

_____ and L. J. Meeker. 1983. Skull morphology of the oldest turtles: a preliminary description of *Proganochelys quenstedti. Journal of Vertebrate Paleontology* 3(1):25-28.

_____ and P. A. Meylan. 1988. A phylogeny of turtles. In Benton, M. J. (editor). The phylogeny and classification of the tetrapods, Volume 1: Amphibians, reptiles, birds. Clarendon Press. Oxford. pp. 157-219.

Halliday, T. R. and K. Adler (editors). 1986. The encyclopedia of reptiles and amphibians. Facts on File Publications. New York.

Jones, A. J. 1972a. A general analysis of the biblical "kind" *(min). CRSQ* 9:53-57.

_____ 1972b. Boundaries of the min: an analysis of the Mosaic lists of "clean and unclean animals. *CRSQ* 9:114-123.

_____ 1982. The genetic integrity of the "kinds" (baramins): a working hypothesis. *CRSQ* 19:13-18.

Lester, L. P. and R. G. Bohlin. 1989. The natural limits to biological change. Second edition. Word Publishing. Dallas, TX.

Mao, S. -H., W. Frair, F.-Y. Yin and Y.-W. Guo. 1987. Relationships of some cryptodiran turtles as suggested by immunological cross-reactivity of serum albumins. *Biochemical Systematics and Ecology* 15(5):621-624.

Marsh, F. L. 1941. Fundamental biology. Author-publisher. Lincoln, NE.

_____ 1976. Variation and fixity in nature. Creation Research Society Books. Terre Haute, IN.

_____ 1978. Variation and fixity among living things. a new biological principle. *CRSQ* 15:115-121.

_____ 1981. Have the Genesis kinds ever crossed? *CRSQ* 18:164-167.

_____ 1982. Genetic variation, limitless or limited? *CRSQ* 19:204-206.

_____ 1987. Five-linked food chain of insects. *CRSQ 23:145-*151.

Obst, F. J. 1988. Turtles, tortoises and terrapins. Second edition. St. Martin's Press. New York.

Payne, J. B. 1958. The concept of "kinds" in Scripture. *Journal of the American Scientific Affiliation* 10(2):17-20.

Pritchard, P. C. H. 1979a. Encyclopedia of turtles. T. F. H. Publications. Neptune, NJ.

_____ 1979b. Taxonomy, evolution, and zoogeography. In Harless, M. and H. Morlock (editors), Turtles perspectives and research. John Wiley. New York. pp. 1-42.

ReMine, W. J. 1991. Discontinuity systematics: a new methodology of biosystematics relevant to the creation model. In Walsh, R. E. and C. L. Brooks (editors). Proceedings of the second international conference on creationism. Volume 2. Creation Science Fellowship. Pittsburgh, PA (in press).

Seidel, M. E. and M. D. Adkins. 1989. Variation in turtle myoglobins (Subfamily Emydinae: Testudines) examined by isoelectric focusing. *Comparative Biochemistry and Physiology* 94B:569-573.

Siegler, H. R. 1974. The magnificence of kinds as demonstrated by canids. *CRSQ* 11:94-97.
_____.1978. A creationist's taxonomy. *CRSQ* 15:36-38, 11.
_____.1983. Some thoughts on kinds. *CRSQ* 20:122-23.
Wise, K. 1991. Baraminology: a young earth creation biosystematic method. In Walsh, R. E. and C. L. Brooks (editors), Proceedings of the second international conference on creationism. Volume 2. Creation Science Fellowship. Pittsburgh, PA (in press).
Yin, F.-Y., W. Frair and S.-H. Mao. 1989. Physical and chemical properties of some turtle blood albumins with taxonomic implications. *Comparative Biochemistry and Physiology* 93B:283-289.

Addendum

Reisz and Laurin in a recent treatment on turtle origins point out that turtles have "substantial fossil records," but that their "origins and relationships . . . have remained unresolved." (p. 324) Their suggestion for the evolutionary dilemma implicates a small South African parareptile, *Owenetta.* If their conclusion were true, then as Fraser has pointed out, there are implications affecting our understanding of the integrity of the whole reptilian class. So we continue to have a phyletic muddle. One way I believe scientists can move toward extricating themselves from this condition would be to give more serious attention to an abrupt appearance (discontinuity) model.

References

Reisz, R. R. and M. Laurin. 1991. *Owenetta* and the origin of turtles. *Nature* 349:324-326.
Fraser, N. 1991. The true turtles story. . . . *Nature* 349:278-279.

SYMPOSIUM ON VARIATION—VI

THE LIMITS OF BIOLOGICAL VARIATION

DARREL KAUTZ*

Received 1 September 1990; Revised 2 December 1990

Abstract

The topic of biological variation in nature is approached from its philosophical and biblical parameters, rather than from the approach of a research scientist.

Introduction

When attempting to understand the limits of biological variation, it is important to recognize certain realities which exist within the world of nature and to operate within those realities. Living organisms, for example, exist according to types or kinds, and that reality makes it possible to classify organisms systematically as taxonomists do. Organisms of a given type, such as roses, corn, dogs and human beings, are known to have the capacity for a limited amount of variation. That reality is often spoken of as microevolution which, essentially, is a reshuffling of existing genes; there is no generation of new genetic information but merely mutation of existing genes.

Law of Biogenesis

Every organism is what it is because of the built-in genetic information present in its parents. Organisms are programmed entities; they have no option of being anything other than what they are programmed to be. Information, in turn, always comes from intelligence, never from nonintelligence; that, too, is one of the realities in the world of nature. The programmed information which resides in the DNA molecule (deoxyribonucleic acid) was imposed on the physics and chemistry of that molecule by an intelligent Being at the time the first organism of a given type was created. The programming of the DNA molecule was a supernatural event by a supernatural Being, namely, the God Who, according to Genesis 1, created a wide assortment of living creatures, each according to its own kind; and He programmed each one genetically to reproduce its kind. Thus in terms of the order of creation, the kinds or types are stable throughout time. That is confirmed by a widely accepted law, namely, the law of biogenesis, the essence of which is that life always comes from life of the same kind.

The genetic information built supernaturally into the DNA molecule is present in such a way that in the process of reproducing, an organism not only replicates itself but does so in such a way that the offspring is slightly different from its parents, yet always of the same type or kind. The genetic programming by the Creator precludes unlimited variation; roses always reproduce roses irrespective of the numerous varieties which are derived and human beings always give birth to human beings, as different as they may be. Through this inbuilt genetic information, the Creator guarantees that the many kinds of originally created plants and animals will remain in existence generation after generation. This stability (stasis) of organisms is also one of the pronounced characteristics which is observed in fossil organisms and the fossil record itself is likewise one of the great realities of nature.

Design

In consequence of the more detailed knowledge about the structure and operation of the biological cell known through the relatively new science of molecular biology, it is more obvious than ever that organisms are products of *design* and that each kind of organism has its own unique features. Two centuries ago William Paley (1743-1805) perceived nature as possessing design, and he published a book entitled *Natural Theology* (1802). Although philosophers and others have attempted to blunt Paley's argument of design, the realities of the biological world as they are known through molecular biology reveal more clearly than ever before that behind every living organism

*Darrel Kautz, M.A., 10025 West Nash St., Milwaukee, WI 53222.

and its unique features stands an all-intelligent Being Who imposed on matter all the information needed to build, maintain and procreate creatures according to their originally created kinds.

Note what molecular biologist Michael Denton says about Paley's argument of design (1986, p. 341).

> Paley was not only right in asserting the existence of an analogy between life and machines, but was also remarkably prophetic in guessing that the technological ingenuity realized in living systems is vastly in excess of anything yet accomplished by man . . . The almost irresistible force of the analogy has completely undermined the complacent assumption, prevalent in biological circles over most of the past century, that the design hypothesis can be excluded on the grounds that the notion is fundamentally a metaphysical *a priori* concept and therefore scientifically unsound. On the contrary, the inference to design is a purely *a posteriori* induction based on a ruthlessly consistent application of the logic of analogy. The conclusion may have religious implications, but it does not depend on religious presuppositions.

The Supernatural

Also relevant to the topic of the limits of biological variation is the question of the existence of a realm of reality in addition to our world of time, mass and space, namely, the *realm of the transcendent, the eternal.* It is erroneous to hold that only that which can be measured and dealt with empirically is real; and that time, matter and space *alone* are the sole realities. There is no way scientifically to validate that viewpoint. Although the realm of the supernatural cannot be researched, yet it can be *inferred* on the basis of what is known in the realm of time, mass and space.

Every person is in a position to conclude that the realm of the transcendent is real. Recall these ancient words:

> What may be known about God is plain to them, because God has made it plain to them. For since the creation of the world God's invisible qualities—His eternal power and divine nature—have been clearly seen, being understood from what has been made, so that men are without excuse (Romans 1:19-20).

From this it can be seen that God expects a person to look at nature and draw the obvious common sense conclusion, namely, that nature came into existence by an almighty Deity. Not to draw that conclusion is to do violence to one's capacity to think logically.

The Holy Scriptures partake of both dimensions of reality. They embody the world of time, matter and space by virtue of their having been written by people who lived in that realm, and they embody the world of eternity by virtue of their having been inspired by the Holy Spirit Who exists in the realm of eternity. Every person needs the Bible as a necessary reference point for his thinking and living. To bypass the Holy Scriptures is to bypass the highest source of truth, to lose one's orientation to the world in which he lives, and to forfeit eternal life with Christ. The lives of people are fulfilled to a high degree when they live in both dimensions of reality as they are known from the Scriptures.

References

Denton, Michael. 1986. Evolution: a theory in crisis. Adler and Adler. Bethesda, MD.

Paley, W. 1855. The works of William Paley: natural theology. T. Nelson. London.

SYMPOSIUM ON VARIATION—VII

SIMILARITIES AND DIVERSITY AMONG ORGANISMS: WHICH WORLD-VIEW DO THEY SUPPORT?

G. T. JAVOR*

Received 5 October 1990; Revised 20 December 1990

Abstract

Both variations and similarities exist among life forms. This article is a brief consideration of the explanations offered for the existence of these, by an evolutionary and by a creationist view of nature. Following the introduction of the subject, three sub-topics will be considered: a) origins of life forms; b) the meaning or purpose of existence for life forms; and c) predictions offered for the future of life forms.

Introduction

Our planet is unique in the solar system in that its surface is completely covered by live organisms. It is not possible to find a cubic inch of surface matter on Earth which would not contain at least 10,000 bacteria. Spores fill the air and microorganisms have been found beneath thousands of feet of water in the ocean. This abundance of life forms on Earth is in stark contrast to our environment in space, where sterility rules as far as scientests have been able to probe.

The phenomenon of life represents such an extraordinary arrangement of matter that it would be remarkable enough if there was only a single form of life on Earth. Instead, the biosphere consists of nearly two million diverse species of organisms. Taxonomists have divided this large number of diverse organisms

*George T. Javor, Ph.D., 25435 Lawton Ave., Loma Linda, CA 92354.

into kingdoms, phyla and divisions, classes, orders, families, genera and species. A case may be made that in a general sense, each organism contributes to the sustenance of other life forms. This is so because the metabolic output of certain life forms are required by other organisms, whose metabolic end-products are in turn needed by the first group. Such cyclic interdependence can be seen as plants and photosynthetic microorganisms liberate oxygen from water for the benefit of aerobic organisms, whose metabolism requires oxygen as the electron acceptor at the terminus of respiration. A byproduct of respiration is carbon dioxide, which is the required source of carbon by photosynthetic organisms. Nitrogen-fixing microorganisms in the roots of legumes convert nitrogen of the air to nitrates which plants use for protein production. Mammals, in turn, depend on plant proteins for their essential amino acids.

There is no naturally occurring biopolymer which could not be degraded by some soil microorganism. Biodegradation of dead organic matter ensures the reuse of carbon atoms, thereby preventing the exhaustion of the carbon pool of the biosphere. Organisms with similar nutritional needs, on the other hand, compete with one another for food. Those with the most efficient transport system and most rapid growth succeed the best.

Similarities

Similarities among organisms are: a) they are all composed of cells (or single cell); b) they have the ability to utilize light or certain chemicals as sources of energy, which they need to drive endergonic processes such as active transport of nutrients, biosynthesis, motility, etc.; and c) they have the ability to reproduce themselves. Although the chemical composition of organisms varies a great deal, striking similarities also exist. With the exception of spores, all have 60-70% water content by weight (Ingraham et al., 1983, Mathews and Van Holde, 1990). Of the dry matter, more than ninety percent are biological polymers (Ingraham et al., 1983), primarily proteins and ribonucleic acids, some lipid and polysaccharide. In plants, the polysaccharide component is enhanced. The hereditary properties of all organisms are coded into the nucleotide sequence of DNA. Similar metabolic pathways exist in bacteria and man. The biochemical processing of matter is organized around the central metabolic processes we call glycolysis, the citric acid cycle and the hexose monophosphate shunt. Many bacteria have more biochemical versatility than the so called “more complex” organisms. Some can synthesize hundreds of different organic substances from glucose alone.

Differences

Differences among organisms form the basis of the classification scheme referred to earlier. These differences have more to do with form and function than with the basics of life processes. Therefore they can be considered as "variations on the theme of life as we know it." The unique features of organisms are encoded in their hereditary material, which are not easily altered. Nevertheless, transfer of genetic mateial does occur in nature, in single cell organisms through transformation and transection as well as through conjugation, and in more complex organisms through mating. Most cells are endowed with restriction endonucleases which destroy the bulk of foreign genetic material in the cell. In order for the in-coming genetic material to be able to interact with the host’s DNA, considerable homology needs to exist between the two. That is, the genetic donor has to be related to the genetic recipient.

What do the similarities and differences among organisms mean, as far as the origin of life is concerned? The evolutionary understanding of origins suggests that all living organisms present on Earth descended from a single common primordial life form. I have argued elsewhere that based on what we know about life (i.e. the requirement for informational biopolymers containing *meaningful* information and the requirement for an extended non-equilibrium system of inter-connected reactions), it is not possible to have a living cell emerge by itself from any environment, under any conditions (Javor, 1987). It is not the purpose here to repeat these points, but to ask, “If we allowed living matter to come into existence on paper, what would we expect?”

It is alleged or implied by evolutionary theorists, that matter will inevitably give rise to life if conditions for life exist. Therefore it should be reasonable to expect many different types of primordial organisms to emerge. It is most surprising that on the entire Earth, only a single organism succeeded as the primordial ancestor. Since there is a great deal of biochemical analogy between extant organisms, however, this indeed is the only reasonable evolutionary postulate that can account for this fact. However, similarities between organisms are balanced with marked differences as well. These differences are caused by diverse amounts of genetic material with different nucleotide sequences in each organism. While mutation can change sequences in DNA, deletions can cause the loss of genetic material and inadvertent gene duplication can even increase the DNA content. There are no known mechanisms which would result in the fabrication of entirely new sets of genes in the primordial organism in order to progress upward on the evolutionary ladder.

The Biblical account of creation clearly specifies separate origins for the distinct "kinds" of life forms by one Creator. The creationist’s explanation of diversity rests in the unique origin of each set of organisms and their similarity in their unique Designer. While there is clear scientific evidence that organisms have the ability to adapt to their environment by appropriate changes of expressions of their genes, there is no reason to assume that this flexibility was not initially built into the organism.

If one asks about the meaning or purpose of living organisms, the evolutionary view suggests that variability enhances survival. However, from a strictly materialistic point of view, what has been achieved by the emergence of life? What advantage accrues to matter when it is part of a living system? As far as it is possible to ascertain, there is none. Atoms and molecules, in fact, react in order to have the lowest possible energy content. In contrast, biomolecules represent high energy configurations, and living systems need to

expend energy merely to remain intact. For example, biomolecules rapidly decompose if they are exposed to the oxidizing environment of air.

That one type of organism uses the metabolic end-product of another may be used by evolutionists as an example of opportunism. However, it is difficult to see competition and opportunism at work in repeated examples of mutual benefit to organisms in reciprocal arrangements. It is far easier to see the handiwork of a Designer when the cycling of matter is considered through the biosphere. Life is a gift of the Creator to his creatures, and this gives meaning and purpose to existence for the creationist. Plant life exists to sustain animal and human life. Humans were created to commune with the Creator, and animals were brought into existence as companions and helpers of humans. Diversity among living forms is a reflection of the Creator's inventiveness. Similarity among organisms, on the other hand, is required for mutual compatibility.

Evolutionary thinking predicts the emergence of new forms of life in the future. Currently observed speciation, the phenomenon of similar groups of organisms developing through genetic isolation, the incapacity to mate, is often cited as evolution at work. However, there can be no question as to the identity of these organisms, even if they are classified as different species. Changes that are truly dramatic in their consequences, so that a new life form emerges, have not been seen. The creationist view allows mutations and adaptations to alter some of the properties of an organism. However, it predicts that no new life-forms will come into existence in the future.

Conclusions

In summary, the observed similarities and differences among organisms and their complementary functions are in harmony with the expected consequences of a Creation event as described in the first two chapters of the Bible. The experimentally testable prediction may be made that existing life forms will not change to distinctly different organisms in the future. In contrast, the evolutionary paradigm does not adequately explain how the current diversity among organisms came into existence and why the biosphere operates in a manner by which raw materials are recycled. The experimentally testable prediction for the future by this paradigm is the emergence of distinctly different organisms from pre-existing life forms.

References

Ingraham, J. L., O. Maaloe and F. C. Neidhardt. 1983. Growth of the bacterial cell. Sinauer Associates. Sunderland, MA. p. 3

Javor, G. T. 1987. Origin of life: A look at late 20th century thinking. *Origins* 14:7-20.

Mathews, C. K., and K. E. van Holde. 1990. Biochemistry. Benjamin/Cummings. New York. p. 8.

PANORAMA OF SCIENCE

Evolution: The Emperor's New "Science"

The heated exchange that constitutes the creation/evolutionism debate is, without doubt, a verbal and literary defense of cherished beliefs. Any individual involved can certainly be expected to promote his chosen position with rigor. A well-known evolutionist most succinctly summarized his beliefs: "Evolution is one of the half dozen "great ideas" developed by science" (Gould, 1981, p. 37).

Yet, nearly a quarter century earlier, an equally well recognized evolutionist noted, in the context of the various "origin-of-life" experiments, that perhaps the "idea" that is evolution was not as "great" as would later be claimed:

> With the failure of these many efforts, science was left in the somewhat embarrassing position of having to postulate theories of living origins which it could not demonstrate. After having chided the theologian for his reliance on myth and miracle, science found itself in the unenviable position of having to create a mythology of its own: namely, the assumption that what, after long effort could not be proved to take place today had, in truth. taken place in the primeval past (Eisley, 1957, p. 199).

It is unclear who Gould was quoting or paraphrasing with his reference to "great ideas." It is, however, clear that not every evolutionist has agreed with his assessment: "Evolutionism is a fairy tale for adults. This theory has helped nothing in the progress of science. It is useless" (Rostand, 1963, p. 31).

It is unclear at what juncture something as useless as evolutionism became a great idea. Is there a failure to make proper distinction between evolution, as a process and evolutionism as a religious concept?

References

Eisley, L. 1957. The immense journey. Random House. New York.

Gould, S. J. 1981. Evolution as fact and theory. *Discover* 2(5):34-37.

Rostand, J. 1963. LeMonde et la vie. Quoted in V. Long, 1978. Evolutionism—A fairy tale for adults. *Homiletic and Pastoral Review* 78(7):27-32.

Bill Crofut and Raymond M. Seaman*

*Catholic Creation Ministries, P.O. Box 997, Jordan, NY 13080.

Reprinted *CRSQ* Volume 4

Introduction

The *Creation Research Society Quarterly* has been published since 1964 (27 complete volumes). Many of the early Quarterlies are out-of-print, yet these past issues contain articles of continuing interest and value. In an effort to make these volumes available, the Board of Directors has incurred considerable expense to reprint them. In order that those interested in good scientific creationist articles, sound criticisms of the evolutionary hypothesis, along with the needed literature citations accompanying the treatises will have a general idea of the contents of each volume, brief synopses will be written to appear in this and future Quarterlies. See Williams, 1990, pp. 57, 58, 93, 94; 1991, pp. 136-138.

DNA-RNA Studies

The June 1967 Quarterly was devoted primarily to comparative protein and DNA-RNA studies. Duane Gish (1967, pp. 13-17) presented a brief history of the discovery of nucleic acids and discussed the precise coding of DNA. Wayne Frair (1967, pp. 18-22, 47)

described some results of his research on the proteins of various turtles. He then related his findings to the concept of kind. John Grebe (1967, pp. 23-30) explained that could generate the vast fossil record preserved how biology based on molecular structure showed no proof of evolution. The statistical odds against chance assemblies of DNA is overwhelming.

A discussion of mutations on three levels of investigation was developed by Walter Lammerts (1967, pp. 35-41):

1. Their original discovery and proof of inheritance according to Mendelian principles;

2. The artificial production of them by radiation and mutagenic chemicals, their actual behavior in natural populations; and

3. The molecular genetic approach.

Lammerts noted that no investigator had shown as yet (1967) that any mutation is so advantageous as to spread through an entire species population of plants or animals. Harold Armstrong (1967, pp. 41-45) explored the possibility that DNA is only a material cause. He concluded that DNA is not the complete cause of life and heredity. All of the forementioned articles contain much information about molecular genetics as well as creationist interpretations of the data.

Chemical Evolution, Gap Between Matter and Life

The Miller and Urey work on the development of complex organic compounds from simpler chemicals compounds was investigated using thermodynamics and kinetics (Williams, 1967, pp. 30-35). It was concluded that there would have never been enough of the necessary complex chemical compounds available in the ancient oceans to allow for spontaneous generation of life even if the latter were possible. During the second half of the nineteenth century, evolutionists tried to fill the gap between matter and life by creating the group of *Monera*— defined as being very simple and that they proved spontaneous generation (Rupke, 1967, pp. 106-113). It was found that the group did not exist in spite of Haeckel's claim. It has been found that even the "simplest" forms of living things are extremely complex.

Botany

The origin of the blue-green algae was discussed by George Howe (1967, pp. 100-105, 115). On the basis of the scientific evidence available, the blue-green algae, the bacteria, the red, brown and green algae are not organically related to each other. The evidence demands design, not neo-Darwinian transformism. In a brief article, using Dutchman's Breeches as an example, Tinkle (1967, pp. 125-126) explained why wild flowers are a problem for the theory of evolution. He postulated design of a stable genetic system rather than development by small changes over thousands of years.

Geology

The interesting geology of Mount Ararat was presented by Clifford Burdick (1967, pp. 5-12). He discussed that area from the viewpoint of cataclysmic Flood geology. Henry Morris' (1967, pp. 89-99, 115) article on sedimentation and the fossil record from a hydraulic engineer's perspective was very detailed. He explained that the Flood is the only realistic mechanism that could generate the vast fossil record preserved in the crust of the earth.

Astronomy

In "Examining the Cosmogonies—A Historical Review," George Mulfinger (1967, pp. 57-69) showed the unbelievable amount of guesswork rampant in astronomy. He examined the following ideas concerning the origin of the solar system:

The Cartesian Hypothesis
Swedenborg's Nebular Hypothesis
Kant's Nebular Hypothesis
Buffon's Collision Hypothesis
Laplace's Nebular Hypothesis
Darwin's Tidal Hypothesis
Planetesimal Hypothesis
Jeans-Jeffreys Tidal Hypothesis
Von Weizsacker's Nebular Hypothesis
Whipple's Dust Cloud Hypothesis
Protoplanet Hypothesis

The following concepts regarding the origin of the universe were examined:

Primeval Atom Hypothesis
"Big Bang" Hypothesis
Steady State Hypothesis
Alfven's Ambiplasma Hypothesis

All of these hypotheses consist of highly imaginative thinking backed by no or very little scientific verification. Mulfinger deplored the fashion in which the popular press advertised these ideas as if they were almost factual. He concluded that only supernatural intelligence and design can account for the universe and the solar system.

Philosophy

Two articles (Whitcomb, 1967, pp. 69-74; Reymond, 1967, pp. 75-80) explored the Scriptural account of creation as well as the examination of two modern translations of the Old Testament. Both men reached the conclusion that the Genesis view teaches a creation *ex nihilo.*

Summary

This well-rounded volume of the Quarterly also contains many technical notes in each issue under the heading "Comments on Scientific News and Views" edited by Harold Armstrong. Three book reviews appeared in this volume as well as editorial comments and some news items. It is a shame that all volumes of the Quarterly are not available in all libraries of universities and colleges where science is taught so that students could have a chance to find the defects in evolutionary theory and see the advantages of scientific creationism.

References

CRSQ—Creation Research Society Quarterly.
Armstrong, H. 1967. Is DNA only a material cause? *CRSQ* 4:41-45.
Burdick, C. L. 1967. Ararat–the mother of mountains *CRSQ* 4:5-12.
Frair, W. 1967. Some molecular approaches to taxonomy. *CRSQ* 4: 18-22.
Gish, D. T. 1967. DNA: its history and potential. *CRSQ* 4:13-17.
Grebe. J. J. 1967. DNA studies in relation to creation concepts. *CRSQ* 4:23-30.
Howe. G. F. 1967. The origin of the blue-green algae. *CRSQ* 4: 100-105, 115.
Lammerts, W. E. 1967. Mutations reveal the glory of God's handiwork. CRSQ 4:35-41.

Morris, H. M. 1967. Sedimentation and the fossil record: a study in hydraulic engineering. *CRSQ* 4:89-99, 115.
Mulfinger, C. 1967. Examining the cosmogonies—a historical review. *CRSQ* 4:57-69.
Reymond, R. L. 1967. Does Genesis 1:1-3 teach a creation out of nothing? *CRSQ* 4:75-80.
Rupke, N. A. 1967. A summary of *Monera* fallacy. *CRSQ* 4:106-113.
Tinkle, W. J. 1967. Wild flowers: a problem for evolution. *CRSQ* 4:125-126.
Whitcomb, Jr., J. C. 1967. The creation of the heavens and the earth. *CRSQ* 4:69-74.
Williams, E. L. 1967. The evolution of complex organic compounds from simple chemical compounds: is it thermodynamicly and kinetically possible? *CRSQ* 4:30-35.
_____1990. Reprinted *CRSQ* volume 1. *CRSQ* 27:57-58.
_____ 1990. Reprinted *CRSQ* volume 2. *CRSQ* 27:93-94.
_____ 1991. Reprinted *CRSQ* volume 3. *CRSQ* 27:136-138

Emmett L. Williams*

*5093 Williamsport Drive, Norcross, GA 30092.

The Coelacanth's Finny Joints

In 1938 the first living coelacanth to be scientifically examined was caught by fishermen off the eastern coast of South Africa. This caused a sensation as this fish was known from the fossil record but thought to have been extinct for 60-70 million years. Thus it entered the oxymoronic category of living fossils. In evolutionary thinking it has been postulated as a possible link between fish and amphibians.

Since 1938 others have been caught and thoroughly examined with quite an extensive literature now extant. Fossil tissues, other than bone, are rarely available for examination, but, in this case, the soft parts of the coelacanth have been extensively studied and reported.

P. L. Florey (1980, p. 369) of the Department of Paleontology of the British Museum writes as follows:

> Recent studies of the soft anatomy of Latimeria have highlighted many similarities with chondrichthyans. These similarities have led to the hypothesis that coelacanths are most closely related to cartilaginous fishes.

Much interest has been focussed on the fins of the coelacanth. They resemble paddles more than typical fins and are somewhat elongated, containing bones, which, to some, seem to vaguely resemble the limb bones of tetrapods. This has led to the evolutionary theory that these fins could be the precursors of limbs of walking animals. One significant snag in this idea concerns the anatomy of the "shoulder" joint. In the ball and socket shoulder joint of tetrapods the ball is on the humerus (the upper arm bone) with the socket on the scapula which is in contact with the bony skeleton. In the coelacanth the "scapula" is buried in soft tissue with the loci of the ball and socket being just the reverse of that in tetrapods.

In a review of J. Millet and J. Anthony, *Anatomic de Latimeria chalumnae*, E. Trewavas (1959, p. 566) has written as follows:

> Any hope that the paired fins might conform to the theoretical (and rhipidistian) precursors of the limbs of land vertebrates is soon dispelled. Not only is there nothing to compare with the radius and ulna (or tibia and fibula), but the pectoral girdle provides the apophysis (the ball, HSH), and the basal joint of the fin lobe the socket, for the pectoral fin joint, instead of vice versa as might have been expected.

This significant difference between the bony structure of the fins of the coelacanth and limbs of tetrapods is just another obstacle when attempting to develop an evolutionary relationship between them.

References

Florey, P. L. 1980. Latimeria: a paradoxical fish. *Proceedings of the Royal Society of London* B208:369-84.
Trewavas, E. 1959. Anatomy of a coelacanth. *Nature* 183:566.

H. S. Hamilton, M.D.*

*1653-140th Street, British Columbia, Canada, V4A 4H1.

Boulder Found in Coal Seam—Implications

Objects in Coal

Objects reportedly found in coal deposits have always interested creationists. Artifacts and human remains have attracted particular attention because it would mean that the coal formed after the origin of man which would be expected if the scientific Flood model is correct. Frair (1969) related that a "human skull" found in brown coal was a fake. Apparently the skull was molded from brown coal mixed with limonite and triplite. The authority on coal geology, Otto Stutzer (1940, p. 271), believed that it was a human skull. Readers may wish to consult both the Frair and Stutzer references; also see Whitcomb and Morris, 1963, pp. 175-176. Rusch (1971, pp. 201-202) presented evidence that an iron pot had been found in a lump of coal. Mulfinger (1973, pp. 63, 65), in discussing the exhibits of Bob Jones University at a regional science fair, noted that a gold chain had been found in a lump of coal as well as the iron pot cited by Rusch. Wiant (1976) showed a photograph of a spoon reportedly found in ash from burned soft Pennsylvania coal. Erich von Fange (1974, pp. 16, 17) briefly discussed some objects found in coal.

Boulder in Coal

The following note by S. W. McCallie, the Assistant Geologist of the state of Georgia in 1903, is quoted in its entirety relating to a boulder found in a coal seam.

> An Erratic Bowlder (sic) from the Coal Measures of Tennessee
>
> Two years ago last summer while on a visit to the Etna coal mines, located near Chattanooga, Tenn., my attention was called to a bowlder which a short time before had been found near the center of a three-foot coal seam. The main attractive feature of the bowlder to the miners, and apparently the cause which led to its preservation from the waste dump, seemed to have been the glittering particles of pyrite to be seen at several points on its surface. The pyrite was supposed by the miners to be gold, and as a consequence the bowlder was spoken of as the "gold rock."
>
> The writer learned that a short time previous to his visit, the bowlder had been shown to one of the United States geologists, who, though then engaged in collecting fossil coal plants at the mines, broke off and carried away a small piece of the stone. With the exception of the removal of

this fragment and a few marks made by the pick in dislodging it from the coal seam, the bowlder was entire and not otherwise mutilated.

The bowlder was elongated, somewhat kidney-shaped, and would weigh when entire twenty or thirty pounds. Its surface was quite smooth and had every appearance of having been water worn. In shape and in size it was not at all unlike stones frequently met with in or near the larger streams of East Tennessee and North Georgia, but on close examination it was found to be entirely different both in structure and mineralogical composition.

The color of the stone is greenish gray, specked with small, irregular dark and light colored spots. In texture it is fine-grained, none of the individual minerals being made out microscopically. Thin sections show that it consists of quartz and feldspar phenocrysts and biotite, in a quartz-feldspar ground mass. The feldspar and also the biotite are usually much altered, the former giving rise to scales of kaolin, and the latter to chlorite. Whether these alterations, antedate the burial of the rock in the Coal Measures, or are of subsequent date, is an open question. However, the smooth surface of the bowlder would seem to indicate that the stone was polished by water when the minerals were in a comparatively fresh state.

A specimen of the rock submitted to Miss Florence Bascom, of Bryn Mawr, for examination was identified by her as an aporhyolyte, though she suggested that the more general term metarhyolyte might also be used. Miss Bascom was unable to decide definitely from a single slide whether the rock cooled as a lava flow, or as a dike, yet no doubt was expressed as to its classification.

The most interesting question which suggests itself in regard to this erratic bowlder is its source. Its water-worn surface would seem to indicate that it had probably been transported some distance by water prior to its deposition in the coal seam, but even this throws little or no light on its original source, as no rocks of like character are to be found in Tennessee or the adjacent portions of Georgia and Alabama. The stratigraphical position of the bowlder fixes the time of its deposition in the latter half of the Carboniferous age, and as a consequence the lava flow or dike from which the bowlder was derived must antedate that period. This would seem to indicate that prior to the latter half of the Carboniferous age at some point not far removed from the Etna coal mines there were dikes or surface flows of rhyolyte which have since been buried beneath subsequent deposits. (McCallie, 1903, pp. 46-47)

Allochthonous Origin of Coal

The finding of a boulder in a coal seam proves nothing about the recent formation of the deposit but it does offer further evidence that the coal had an allochthonous (transportation and deposition) origin as opposed to an autochthonous (growth-in-place) origin such as a peat bog. The former method of placement would fit a Flood model. Morris noted in *The Genesis Flood* that boulders are commonly found in coal beds (Whitcomb and Morris, 1963, pp. 162-165). Creationists have pointed out many evidences that support the allochthonous origin of coal as well as citing the Flood as the only possible agent that could have caused many of the sedimentary deposits in the earth's crust.

Coffin (1969) investigated the Joggins petrified trees and suggested rapid sedimentation and an allochthonous origin. Peters (1971) claimed that the cyclical black shales of the Pennsylvanian system west central Illinois were formed as a result of transportation of the material to its burial site followed by a rapid burial. Clark (1971, p. 21) suggested that coal beds and the fossils found in them could best be explained as being deposited by the Flood. Armstrong (1972) outlined evidence against the peat bog theory. Mulfinger (1973, pp. 63, 65) supported an allochthonous origin of coal. Peters (1973, p. 90) explained that coal and sediment mixtures are evidence of tidal rafting as a result of the Flood. In a textbook for Christian schools, Mulfinger and Snyder (1979, pp. 287-288) offered evidence against the peat bog theory and supported a Flood model for the formation of coal. Austin wrote his Ph.D. dissertation (1979) defending the allochthonous origin of coal and in his recent book (1984, pp. 203-204, 211-214), he offered more evidence for this model. Also Austin (1986, p. 9) observed that a layer of peat several inches thick on the bottom of Spirit Lake, near Mount St. Helens,

> resembles, both compositionally and texturally, certain coal beds of the eastern United States which also are dominated by tree bark and appear to have accumulated beneath floating log mats. Coal is supposed conventionally to have accumulated from organic material accumulated in swamps by growth in place of plants and burial. Because the accumulation of peat in swamps is a slow process, geologists have supposed that coal beds required about one thousand years to form each inch of coal. The peat layer in Spirit Lake argues that peat can accumulate rapidly. Swamp peats, however, have only very rare bark sheet material because the intrusive action of tree roots disintegrates and homogenizes the peat. The Spirit Lake peat in contrast is texturally very similar to coal. All that is needed is burial and slight heating to transform the Spirit Lake peat into coal. Thus, at Spirit Lake we may have seen the first stage in the formation of coal.

The peat layer and associated sheets of tree bark on the bottom of Spirit Lake were deposited as a result of the May 18, 1980 explosion of Mount St. Helens.

Conclusion

The allochthonous origin of coal appears to be a more viable model than the autochthonous model. It is hoped that more articles and notes will be written by creationists to support the Flood model of coal formation.

Appendix

Coal—Other Studies

Some other creationist writings on coal may be of interest. Burdick (1970, p. 143) felt that the extensive coal measures in Antarctica indicated a world-wide

mild climate at some time in the past. Armstrong (1973) stated that the lead ratios in certain coals were richer in radiogenic lead than the average composition of the continental crust and he offered an interpretation of the data based on the Flood. Wiant (1974) used the available figures of the estimated coal deposits around the world and concluded that if one assumed that the pre-Flood earth was as productive as our tropical forests of today and there was more land mass before the Flood than there is now, all of the coal beds could be accounted for by the destruction of one biomass. See Woodmorappe (1986) for a more complete analysis of the carbon available on the antediluvian earth for coal formation. Connor (1977) discussed radiohalos in coalified wood as evidence for a young earth. Gentry et al. (1976) suggested that the presence of radiohalos in coalified wood indicated that the time required for coalification could be quite short. Johnson (1974, p. 109) noted some recent experiments that could be used to indicate that coal formation during and after the Flood was quite rapid.

References

CRSQ – Creation Research Society Quarterly.

Armstrong, H. L. 1972. Allochthonous coal considered. *CRSQ* 9:74-75.

_____ 1973. Lead ratios and the age of coal. *CRSQ* 9:242, 244.

Austin, S. A. 1979. Depositional environment of the Kentucky no. 12 coal bed (middle Pennsylvanian) of western Kentucky, with special reference to the origin of coal lithotypes. Ph.D. Thesis. The Pennsylvania State University. University Park, PA.

_____ 1984. Catastrophes in earth history. Institute for Creation Research. El Cajon, CA.

_____ 1986. Mount St. Helens and catastrophism. Proceedings of the First International Conference on Creationism, August 4-9. Volume I. Creation Science Fellowship. Pittsburgh. pp. 3-9.

Burdick, C. L. 1970. The structure and fabric of geology. *CRSQ* 7:142-147.

Clark, H. W. 1971. Paleoecology and the Flood. *CRSQ* 8:19-23.

Coffin, H. G. 1969. Research on the classic Joggins petrified trees. *CRSQ* 6:35-44.

Connor, S. J. 1977. Radiohalos in colaified wood: new evidence for a young earth. *CRSQ* 14:101-102.

Frair, W. 1969. The human skull composed of coal. *CRSQ* 5:133-135.

Gentry, R. V., W. H. Christie, D. H. Smith, J. F. Emery, S. A. Reynolds, R. Walker, S. S. Cristy and P. A. Gentry. 1976. Radiohalos in coalified wood: new evidence relating to the time of uranium introduction and coalification. *Science* 194:315-318.

Johnson, G. L. 1974. The Genesis Flood and the geological record. *CRSQ* 11:108-110.

McCallie, S. W. 1903. An erratic bowlder from the coal measures of Tennessee. *The American Geologist* 31(1):46-47.

Mulfinger, G. 1973. A unique creationist exhibit. *CRSQ* 10:62-68.

_____ and D. E. Snyder. 1979. Earth science for Christian schools. Bob Jones University Press. Greenville, SC.

Peters, W. C. 1971. The cyclical black shales. *CRSQ* 7:193-200.

_____ 1973. Field evidence of rapid sedimentation. *CRSQ* 10:89-96.

Rusch, Sr., W. H. 1971. Human footprints in rocks. *CRSQ* 7:201-213.

Stutzer, O. 1940. Geology of coal (translated by Noe, A. C.). University of Chicago Press. Chicago.

von Fange, E. A. 1974. Time upside down. *CRSQ* 11:13-27.

Whitcomb, Jr., J. C. and H. M. Morris. 1963. The Genesis Flood. Presbyterian and Reformed. Philadelphia.

Wiant, Jr., H. V. 1974. A quantitative comparison of the carbon in the biomass and coal beds of the world. *CRSQ* 11:142.

_____ 1976. A curosity from coal. *CRSQ* 13:74.

Woodmorappe, J. 1986. The antediluvian biosphere and its capacity of supplying the entire fossil record. Proceedings of the First International Conference on Creationism, August 4-9. Volume II. Creation Science Fellowship. Pittsburgh. pp. 205-218.

INDEX TO VOLUME 27 OF THE CREATION RESEARCH SOCIETY QUARTERLY

A

A Changing Variables Model for the Speed of Light by Cam de Pierre, 71

A Neurochemical Creationist Concept Based on *In Vitro* Studies of Brain mRNAs of Three Lumber Vole Species: *Clethrionomys glareolus, Clethrionomys frater* and *Clethrionomys gapperi,* by Dimitrij A. Kuznetsov, 128

A Preliminary Report on the Geology of Southwestern Virginia by Eugene F. Chaffin, 18

An Introduction to the Possible Role of Cavitation in the Erosion of Water Channels by Edmond W. Holroyd, III, 23

An Early Christian View of Genesis One by David Watson, 138

B

Baumgardner, John R.
The Imperative of Non-Stationary Natural Law in Relation to Noah's Flood, 98

Brown, R. H.
Radiohalo Evidence Regarding Change in Natural Process Rates, 100

Byl, John
on the Viability of Variable Constants, 68

C

Chaffin, Eugene F.
The Difficulty in Obtaining Realistic Conclusions about Variable Constants, 6
A Preliminary Report on the Geology of Southwest Virginia, 18

Changing Constants and the Cosmos by Glen R. Morton, 60

Critique of "Radiohalo Evidence Regarding Change in Natural Process Rates" by Robert V. Gentry, 103

Crofut, Bill and Raymond M. Seaman
Evolution: A Cosmic Numbers Game, 59
Evolution: Factual or Fanciful?, 59
Evolution: The Bitter Fruit of Dogmatism, 136
Evolutionism: A Charge Looks Back, 37
Evolutionism: A View through Rose-Colored Blinders, 35
Evolutionism: Bones and Stones of Contention, 35
Evolutionism: Genetic 'Egg'-Sasperation, 57
Evolutionist: Contradict Thy Ownself, 56

D

Davidheiser, Bolton
What is a Species?, 149

Dedication to George F. Howe by Wilbert Rusch, Sr., 86

Dedication to Paul A. Zimmerman by Wilbert Rusch, Sr., 122

de Pierre, Cam
A Changing Variables Model for the Speed of Light, 71

E

Euphorbia Antisyphilitica (The Candelilla Plant) Demonstrates Providence, Design and Typology in Creation by George F. Howe and Emmett L. Williams, 86
Evolution: A Cosmic Numbers Game by Bill Crofut and Raymond M. Seaman, 59
Evolution: Factual or Fanciful? by Bill Crofut and Raymond M. Seaman, 59
Evolution: The Bitter Fruit of Dogmatism by Bill Crofut and Raymond M. Seaman, 136
Evolutionism: A Charge Looks Back by Bill Crofut and Raymond M. Seaman, 37
Evolutionism: A View Through Rose-Colored Blinders by Bill Crofut and Raymond M. Seaman, 35
Evolutionism: Bones and Stones of Contention by Bill Crofut and Raymond M. Seaman, 35
Evolutionism: Genetic 'Egg'-Sasperation by Bill Crofut and Raymond M. Seaman, 57
Evolutionist: Contradict Thy Ownself by Bill Crofut and Raymond M. Seaman, 56
Evolutionist: Friend or Foe? by Bill Crofut and Raymond M. Seaman, 94

G

Gentet, Robert E.
Geological Evidence of Early Man, 122
Gentry, Robert V.
Critique of "Radiohalo Evidence Regarding Change in Natural Process Rates," 103
Geological Evidence of Early Man by Robert E. Gentet, 122
Good News from Neptune: The Voyager 2 Magnetic Measurements by D. Russell Humphreys, 15

H

Hamilton, H. S.
The Eye: By Chance or Intelligence, 141
Herrmann, Robert A.
World-Views and the Metamorphic Model: Their Relation to the Concept of Variable Constants, 10
Holroyd, III, Edmond W.
An Introduction to the Possible Role of Cavitation in the Erosion of Water Channels, 23
Some Simulations of the Possible Role of Cavitation in Catastrophic Floods, 49
Howe, George F. and Emmett L. Williams
Euphorbia Antisyphilitica (The Candelilla Plant) Demonstrates Providence, Design and Typology in Creation, 86
Humphreys, D. Russell
Good News from Neptune: The Voyager 2 Magnetic Measurements, 15

I

Index to Volume 26 of the *Creation Research Society Quarterly*, 33
Is More Than Gene Action Required to Account for Variation? by Lester J. McCann, 151

J

Jonathan Edwards-Scientist by Emmett L. Williams, 36

K

Kaufmann, David A.
Minutes of 1990 Creation Research Society Board of Directors Meeting, 96
Keyword Index to Volume 26 by Glen W. Wolfrom, 140
Kuznetsov, Dimitrij A.
A Neurochemical Creationist Concept Based on *in Vitro* Studies of Brain mRNAs of Three Lumber Vole Species: *Clethrionomys glareolus, Clethrionomys frater* and *Clethrionomys gapperi,* 128

M

McCann, Lester J.
Is More Than Gene Action Required to Account for Variation?, 151
Minutes of 1990 Creation Research Society Board of Directors Meeting by David A. Kaufmann, 96
Morton, Glenn R.
Changing Constants and the Cosmos, 60

O

On the Viability of Variable Constants by John Byl, 68

P

Possible variability in Living Organisms—A Review of *CRSQ* Writing by Emmett L. Williams, 144

R

Radiohalo Evidence Regarding Change in Natural Process Rates by R. H. Brown, 100
Rapid Erosion by Emmett L. Williams, 96
Reprinted *CRSQ* Volume 1 by Emmett L. Williams, 57
Reprinted *CRSQ* Volume 2 by Emmett L. Williams, 93
Reprinted *CRSQ* Volume 3 by Emmett L. Williams, 136
Rusch, Sr., Wilbert
Dedication to George F. Howe, 86
Dedication to Paul A. Zimmerman, 122

S

Some Simulations of the Possible Role of Cavitation in Catastrophic Floods by Edmond W. Holroyd, III, 49

T

The Difficulty in Obtaining Realistic Conclusions about Variable "Constants" by Eugene F. Chaffin, 6
The Eye: By Chance or Intelligence by H. S. Hamilton, 141
The Imperative of Non-Stationary Natural Law in Relation to Noah's Flood by John R. Baumgardner, 98
The Threat from Theistic Evolution by Paul A. Zimmerman, 91

W

Watson, David
An Early Christian View of Genesis One, 138
What is a Species? by Bolton Davidheiser, 149
Williams, Emmett L.
Jonathan Edward–Scientist, 36
Possible Variability in Living Organisms—A Review of CRSQ Writings, 144
Rapid Erosion, 96
Reprinted *CRSQ* Volume 1, 57

Reprinted CRSQ Volume 2, 93
Reprinted *CRSQ* Volume 3, 136
Wolfrom, Glen W.
Keyword Index to Volume 26, 140
"You Are What You Eat," 36
World-Views and the Metamorphic Model: Their Relation to the Concept of Variable Constants by Robert A. Herrmann, 10

Y

"You Are What You Eat" by Glen W. Wolfrom, 36

Z

Zimmerman, Paul A.
The Threat from Theistic Evolution, 91

ARTICLE AND BOOK REVIEWS

Biblical Myths and Mysteries reviewed by Clifford L. Lillo, 157
Charles Darwin's Religious Views: From Creationist to Evolutionist reviewed by Jerry Bergman, 154
Creation or Evolution: Correspondence on the Current Controversy reviewed by Wilbert H. Rusch, Sr., 154
Creationism and the Dinosaur Boom reviewed by Paul A. Garner, 105
From Eternity to Eternity reviewed by Clifford L. Lillo, 38
How Life Began reviewed by David and Kenneth Rodabaugh, 107
In the Beginning reviewed by Don B. DeYoung, 156
Of Pandas and People: The Central Question of Biological Origins reviewed by Trevor J. Major, 38
Science, Scripture and Salvation reviewed by Emmett L. Williams, 110
The Life and Death of Charles Darwin reviewed by John W. Klotz, 39
The Long War Against God reviewed by Clifford L. Lillo, 73
The Long War Against God reviewed by Daniel P. O'Deens, 111
The Origin of Species Revisited, Volumes I and II reviewed by Wilbert H. Rusch, Sr., 109
Twentieth Century in Crisis: Foundations of Totalitarianism reviewed by Don B. DeYoung, 73
Wonderful Life: The Burgess Shale and the Nature of History reviewed by Michael J. Oard, 74
Wonderfully Made reviewed by David A. Kaufmann, 109

LETTERS TO THE EDITOR

Article by John Byl by R. H. Brown, 157
Australian Creationist Journal by Andrew Snelling, 158
Definition of Science by Lawrence and Felicia McGhee, 40
Ellesmere Island: Evidence for Catastrophism? by Timothy L. Munyon, 42
Genesis and Genetics Continued by Raymond Bray, 113
Ichnofossils Exposed to the Elements by Emmett L. Williams, 76
International Conference on Creationism by Robert E. Walsh, 42
Moon Dust by George Matzko, 77
Reply to McGhee by Robert E. Kofahl, 41
Reply to Williams by William Waisgerber, 77
Response to Bray by Vernon A. Raaflaub, 114
St. Augustine and Genesis by David C. C. Watson, 78
Statistical Corrections by Alan Montgomery, 114
Young Universe by Michael Shaver, 113

DOES THE NEO-DARWINIAN PRINCIPLE OF HOMOLOGY WORK AT THE GENOME LEVEL?

DIMITRIJ A. KOUZNETSOV* AND ANDREY A. IVANOV**

Received 12 October 1990; Revised 30 November 1990

Abstract

*Brain tissues from wild forest mice **(Clethrionomys)** of two similar species were used for isolation and purification of highly homologous polyribosomal poly(A)$^+$ mRNA sequences by molecular-hybridization with depleted bacterial plasmid DNAs. The isolated highly homologous populations of mRNAs from both organisms were translated **in vitro** using cell-free protein synthesis systems. Resulting polypeptides chains were analyzed by slab-gel electrophoresis to test the extent of homology between proteins encoded by the homologous mRNAs. Results indicate a lack of correlation between mRNA homology and protein homology.*

Introduction

Homology among sequences of so-called "informational biopolymers" (DNA and mRNA) are treated as ideal criteria for an estimation of phylogenetic relationship in most recent biochemical and biophysical studies. These studies have included a large scale of living systems from viruses (Davison and Taylor, 1987) to primates including man (Walker and Gedamu, 1990). But interpretation of these data, including the efficiency of DNA-DNA and DNA-RNA hybridization methodology, involve difficult theoretical and technical problems which lead to many misunderstandings (Britten, 1989; Marks et al., 1989; Hasegawa et al., 1989). Therefore, questions about the scientific significance of DNA-DNA and DNA-RNA homology as background for evolutionary conclusions must be investigated both theoretically and empirically. For these reasons we have investigated correlations between the extent of eukaryotic mRNA homology and the extent of homology between polypeptides chains encoded by these mRNA sequences.

*Dimitrij A. Kouznetsov, Ph.D. and **Andrey A. Ivanov, M.S., The Protestant, P.O. Box 83, Moscow 123290, USSR.

Procedures

The poly(A)$^+$mRNA was isolated and purified from the brain tissue of wild forest mice, *Clethrionomys frater* and *Clethrionomgy gapperi* (referred to hereafter by upper case numbers 1, 2), using standard procedures of phenol-chloroform deproteinization of polyribosomes followed by chromatography on Poly-(U)Sepharose (Kouznetsov and Richter, 1987). For isolation of homologous mRNA sequences, we used a semi-preparative version of hybridization according to De Groot et al. (1987). The pMC9, PGX12 and PFIPVB12 purified depleted recombinant plasmids were donated by Dr. Solomon Torin, Department of Virology, School of Medicine, UCLA. Hydroxyapatite chromatography was used for the separation of stable hybrids from non-complimentary sequences (Anonymous, 1984). Then homologous mRNA^1 and mRNA^2 sequences were extracted from hybrids with 1.7 M guanidine thiocyanate, and the ethanol-precipitated pellets washed with 2xSSC solution using ultrafiltration through Diaflo YM30 membranes. The mRNA samples were treated with RNase-free DNase. Integrity and purity of homologous mRNAs isolated from *C. frater* and *C. gapperi* were controlled by electrophoresis in 2.6% agarose gel containing 7 M urea, 1 mM EDTA, and 0.035 M tris-borate buffer (pH 8.30). Purified homologous sequences of mRNA^1 and mRNA^2 were translated in rabbit reticulocyte lysate cell-free systems containing [^{35}S]-L-methionine as a protein precursor.

Procedures with the cell-free translation system were carried out according to De Groot et al. (1987). Selective inhibition of protein synthesis initiation reactions were arrested by addition of 85 umol/ml of Pactamycin. The polypeptides chains synthesized *in vitro* were analyzed using slab electrophoresis in linear 7.5-20% polyacrylamide gel containing 1% SDS, 0.1% iodoacetamide, 0.025 M tris (pH 8.0), at 150 v per each 0.2 x 120 x 120 mm gel. After fixation in 7.5% acetic acid, gels were dried under vacuum and then scanned for [^{35}S]-scintillation in a DBM-3 Autoradioanalyser.

Results

As seen in Figure 1, the polypeptides chains which had been programmed by highly-homologous messenger RNAs do not share electrophoretic likeness. The heterogeneities of polypeptides chains synthesized by homologous mRNA^1 and mRNA^2 templates (both complementary to one and the same DNA strands) indicate a very low extent of homology of resulting proteins. Significant *differences* were observed in all six experiments using three different plasmid DNA strands.

At least in the case of biological templates tested, we find no strong correlation between nucleic acid homology in two similar species of wild animals, and homology of proteins encoded by these isolated homologous nucleic acid sequences (mRNA, DNA).

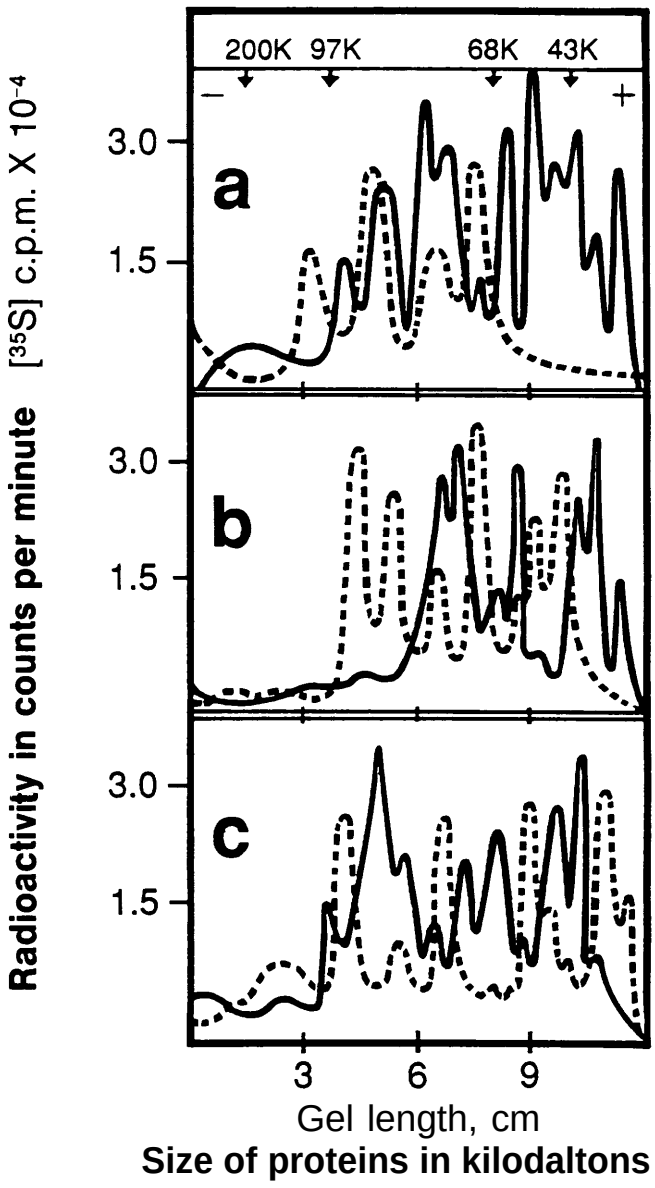


Figure 1. These autoradiographs were obtained from the sulfur-labeled amino acid, methionine, which had been incorporated into polypeptides chains in cell-free translation systems. Highly homologous mRNA templates had been isolated from *Clethrionomys frater* and *C. gapperi* brain cells.

— Polypeptides chains programmed by mRNA *(C. frater).*

------ Polypeptides chains programmed by mRNA *(C. gapperi).*

Polypeptides chains programmed by mRNAs extracted from hybrid with:

a. pGX12 plasmid DNA.
b. pMC9 plasmid DNA.
c. pFIPVB12 plasmid DNA.

Discussion

In summarizing these data we emphasize that proteins constitute the molecular basis for more gross phenotypes, such as tissues and organs. However, our research utilizing three types of highly homologous fractions of purified mRNA from each of two similar species of wild forest mice, shows that in all three cases the proteins translated by the highly homologous pairs of mRNA differ considerably, as determined by electrophoresis. Sequence likenesses between mRNAs from two similar organisms are not reflected in sequence likenesses between the translated proteins. We consider that our data indicate caution in accepting any evolutionary conclusions based on the data of DNA-RNA homology among similar organisms. Similarity is not enough to indicate relationship.

As for causes of observed phenomena, our opinion is that they occur because of the limits of precision in

modern DNA-DNA and DNA-RNA hybridization research. Often results of this research are interpreted to fit a broad evolutionary pattern, but our observations indicate that more restraint and caution should be exercised in evaluating results of these types of studies.

Acknowledgments

This work was supported by a grant from the Institute for Creation Research, El Cajon, CA. We are very grateful to Mr. Oleg Stein and Mrs. Nataliya Rovenko for their qualified technical assistance. Also we would like to express our sincere gratitude to Mr. David Arndt for his help in the collection of animals, and to Dr. Wayne Frair of The King's College for his kind help in improving the style of this paper.

References

Anonymous. 1984. Hydroxyapatite chromatography: a guide. Pharmacia Fine Chemicals A.B. Publishers, Uppsala. Sweden.

Britten, R. J. 1989. Comment on a criticism of DNA hybridization measurements. *Journal of Human Evolution* 18:163-164.

Davison, A. J. and P. Taylor. 1987. Genetic relations between Varicella-Zoster virus and Epstein-Barr virus. *Journal of General Virology* 68:1067-1079.

De Groot, R. J., R. J. T. Haar, M. C. Horzined, and B. A. M. van der Zeijst. 1987. Intracellular RNAs of the feline infectious peritonitis coronavirus 79-1146. *Journal of General Virology* 68:995-1002.

Hasegawa, M., H. Kishino, and T. Yano. 1989. Estimation of branching dates among primates by molecular clocks of nuclear DNA which slowed down in Hominoidea. *Journal of Human Evolution* 18:461-476.

Kouznetsov, D. A. and V. Richter. 1987. Modulation of messenger RNA metabolism in experimental methyl mercury neurotoxicity. *International Journal of Neuroscience* 34:1-17.

Marks, J., C. W. Schmid, and V. M. Sarich. 1989. Response to Britten. *Journal of Human Euolution* 18:165-166.

Walker, J. M. and L. Gedamu. 1990. A human metallothionine pseudogene containing AG/CT repetitive elements. *Journal of Molecular Evolution* 31:211-220.

PHILOSOPHICAL ESSAY

HISTORICAL VARIATION IN THE HUMAN CREATURE

L. MACAOIDH*

Received 7 October 1990; Revised 30 January 1991

Abstract

The human body has varied little in basic structure but our historical artifacts have changed dramatically. Intelligence, seeking to conquer "chance" by force, speed, efficiency and control, is largely responsible. Evolutionary science does not care about quality but rather quantity under mathematical control. Rejecting supernatural intelligence by fiat in the very definition of the scientific method, leaves reason without a true foundation for the existence of anything. More important, the final source of all variation is ignored. This source is Gods love of the beauty and complexity of the design he himself created. As we are made in His image, we should likewise enjoy His work of beauty and complexity. Evolution has stolen this from the life of millions.

Introduction

The world is full of millions of things: plants that fix sunlight energy for food, the ceaseless ocean tides, high mountain timber, tiny amoebas, massive rhinoceros and delicate humming birds. Heavenly bodies and earthly creatures, often of startling and strange array, are everywhere. We are not their source, nor did we create ourselves, yet we can use our bodies in incredibly varied ways, generating strikingly diverse cultures. This variety is based in intelligence, not random processes or mutations. Each person and each culture has a unique bounding line. These bounding lines define the field of action and the dwelling place of each human. This boundary line is both physical and spiritual—our dearest friends in another state are spiritually "closer" than a passerby a few feet away.

The Evolutionary Model and Human Variation

According to evolution, all variation in nature and man have chance, natural law, and time as their source. By chance and chaos, all life evolved from an original explosion of dead matter. Evolution maintains that there is no unique bounding line for each creature and culture. Transitional forms must abound. Our intelligence, grounded in chance, cannot rise above its chance "cause." Thus any thought is as "good" as another. Even Darwin's thoughts are true only as by majority vote, not objective knowledge based in absolute truth.

In the evolutionary model, men are a mass of self conscious beings, reaching more and more closely to the goal of perfection as proposed by the leading evolutionary scientists. Evolutionary men hope to develop an autonomous utopia of their own design, subject to no god. Man can do anything. He is on his way to control of the universe, the final frontier. Soon every being on the earth or in the skies will be numbered and graphed and tracked with the exception of God, who has been declared dead and need not be counted!

Force, speed, efficiency, and control are the values of the coming world government utopia, with mathematics as the operational language. Quality, beauty, truth, justice and love are no longer factors. Quantity is the sole guide. Variation among all things is to be crushed. The devices and gadgets do man's work. Man controls all their actions through his intelligence. There is a downgrading of quality for the sake of monotonous, efficient repetitious action as in fast-food chains and educational mills.

Nature is the "raw" material for man's gigantic refabrication schemes to turn her into designs of every human wish. Nature has no independent meaning and is self-generated by chance. Chance provides the many

*L. MacAoidh, M. A., 14019 S.E. Market St., Portland, OR 97233.

favorable mutations needed for evolution's meaningless, directionless pathway without rhyme or reason. Such a production has not occurred, however, the great majority of mutations being detrimental to the creature or plant. Nature is worshiped as an illustration and catalog of what chance, natural law and time produced in the millions of years before man's appearance. To the evolutionist chance is amazingly "creative." Much more creative items are to come as man's total guidance improves chance's illogical ways by his curious rationality. Man will do much better as the endlessly evolving millennia roll along. Endless, that is, until the sun burns out and the impermanence and meaninglessness of everything is made clear.

Only the evolving tip of the future is ever important to the evolutionist. The past is always a simple preparation for the better as the future unwinds toward utopia and then the final nothingness. Those who helped prepare the way will cheer the final, perfected human, before the great freezing darkness comes.

According to the evolving model, tremendous change based on natural selection has moved the self-existent life force from dead matter via evolution to amino acids, replicating DNA, proteins, mice and men—all via chance variations and the familiar marvels brought by natural law and time. A key question arises at this point. Whence came the pattern of variations upon which natural selection is to work and why do they follow a closely related pathway until, say, an eye is formed?

> At that moment when the RNA/DNA system became understood the debate between evolutionist and creationist should have come to a screeching halt (Taylor, 1989, p. 24).

The mark of extreme intelligence, not chance, is behind the scientific evidence that variety is always bounded, with no transitions from one variety of tool or gadget or creature to another. Nor has any transition from reptile to hummingbird or hawk ever occurred.

> This is true because the problem of origin of life is not unique—it only represents the most dramatic example of the universal principle that complex systems cannot be approached gradually through functional intermediates because of the necessity of perfect co-adaption of their components as a pre-condition of function (Denton, 1985, p. 270).

Little variation of the human body has occurred since the time of Noah. However, massive changes in the gadgets, buildings, transportation machines and political and social structures have appeared during the history of man, especially in the last 200 years of western history. Obviously, there has been tremendous variation and change in production tools and items produced by the use of the tools such as oscilloscopes and CAT scans. However, despite this "evolution" all men, with whatever gadgets are provided, are still subject to death. Finally, the fittest do not survive. The question of the final meaning of life continues to face each man. Society cannot face it for us. Death is absolutely individual. Why all the variations if they simply cause a bit longer term of life before death? The question is not really answered by the evolutionist, save with some entropic nonsense about cryogenics.

> The likelihood of the formation of life from inanimate matter is one to a number with 40,000 noughts after it . . . It is big enough to bury Darwin and the whole theory of evolution . . . if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence (Taylor, 1989, p. 61).

The Creator/Creation Model

The creation model understands the simple reason for the vast variety in creation. The Creator loves it! Creation and man are never meaningless to God. Again, God and believers delight in the variations in the universe and especially those on earth. That is why, for example, He programs variety in the structure of DNA. DNA is designed to produce beautiful variations on a theme in each created kind.

> It is important to note that the information transmitted by DNA is not written on or within the molecules themselves. It is transmitted by the intelligently-organized pattern of their arrange-ment. Molecules have no intelligence. And, like a computer disk, DNA has no intelligence. The complex purposeful codes of this "master program" could only have originated outside itself . . . Intelligence must have come first, before the existence of DNA (Taylor, 1989, p. 24).

Historical Varieties in Human Artifacts

Human bodily variation is tiny compared with the "things" issuing from the mind of man, especially in recent history. What is the meaning of this wave of invention? The fear of death is behind the host of things and devices. They are to smooth life out and slow down its decay. So far it has seen little success. More people are living longer, but the length of each life is still threescore and ten as Psalm 90:10 declares. The outburst of "things" to preserve us is closely tied to the virtual extinction of faith in life after death on the part of modern secular man. This life is all there is: "you only go round once." Darwinism elevated chance to the mighty role of God and turned the intellectuals back from the God of compassion and mercy and resurrection life. Now our own gadgets must and will save us, they boast. This drive for utopia in an entropic universe has caused the reality alluded to by T. S. Eliot in the *Four Quartets:*

> The whole earth is our hospital
> Endowed by the ruined millionaire,
> Wherein, if we do well, we shall
> Die of the absolute paternal care
> That will not leave us, but prevents us
> everywhere (Eliot, 1971, p. 128).

A glance into the jungle of care gone wild is the scene in the modern hospital, where dying becomes a mechanized "wonderland" of man's devices and the souls of the dying are of little or no concern.

The historical variations in human consciousness and behavior result from the adoption of differing theories of knowledge and first principles. Buddhism and Christianity, for example, have totally differing epistemology and metaphysics. The truth of these varying foundations is decided by the individual. Any historical understand-

ing may be entered into at any historical moment. The popularity of differing theories of knowledge, epistemology and first principles, changes throughout history.

In order to build deep, textured layers of space/time history, with many historical variations, the living soul needs, paradoxically, limits to change. We do not delight in swift and continuous variation. It is threatening to move at high speed, knowing that a real or symbolic crash could destroy us. Yet we live in an age continually subjecting us to just this possibility and praising it to the hilt, however much it disturbs. On the other hand, slow movement such as that of a person in confinement is boring and considered a punishment. The prisoner is not free to enjoy the many different sights and sounds of life outside. He is confined in a cell with no window or perhaps a tiny one. The lack of variety is maddening.

However, our pattern does not cycle endlessly. We are moving in a direction. Basically we have two major directional possibilities, both of which follow an arrow of purpose. We may seek to control and transform the fire of growing, blooming, and decaying nature, ever refabricating greater wonders of our making, hoping to control it all at last, but finally with no hope. Our final hope will be to join Issac Asimov in meaningless nothingness after death (Meyers, 1989, p. 272).

The other arrow of purpose seeks first the Creator. He provides our needs within our temporary creaturehood as He also does with the future.

References

Denton, Michael. 1985. Evolution: a theory in crisis. Adler and Adler. Bethesda, MD.

Eliot, T. S. 1971. The complete poems and plays. Harcourt, Brace and World. New York.

Moyers, Bill. 1989. A world of ideas. Doubleday. New York.

Taylor, Paul. 1989. Origins answer book. Films for Christ. Mesa, AZ.

BOOK REVIEWS

Genesis and the Dinosaur by Erich A. von Fange. 1990. Living Word Services, 72876 CR 29, Syracuse, In 46567. 311 pages. Paperback, $15.95.

Reviewed by Don B. DeYoung*

The author is Emeritus Professor of Psychology and Statistics at Concordia College, Ann Arbor, MI. He has lectured widely on dinosaurs, and has studied their bones both at excavations and in national museums.

One purpose of this very readable book is to "hang out for a much needed airing known humbugs and frauds about dinosaurs" (p. 15). Dr. von Fange also discusses the age of the earth, theories of dinosaur extinction, and ancient petroglyphs of dinosaur-like animals. The actual text covers 160 pages; an additional 151 pages cover appendices and two reprints of CRSQ articles by von Fange. *Genesis and the Dinosaur* contains no subject, name, or scripture index, a near-fatal omission for a book which otherwise is a useful reference. The book is self-published and illustrated with black and white photos and drawings. I caught seven printing errors at first reading, but even a major publisher is no guarantee of perfection! Many of the 250 references are secondary rather than primary.

Dr. von Fange places the dinosaur age between the Fall and the Flood. He sees these creatures as misfits and monsters, perhaps macromutations caused by intense radiation following the curse (p. 30). He proposes a rapid, degenerative change from simple, graceful animal shapes with "clean limbs" to the "strange" triple horns, great ruffs, and sail-like spinal fins of dinosaurs (p. 31). Perhaps because of this bias, the author does not dwell on the incredible design of these magnificent creatures. Many readers will prefer to accept dinosaurs as a part of the original, perfect creation. It is ironic that evolutionists discuss in detail such design aspects as the air-conditioning ability of stegosaurus fins (Farlow, 1976), while this creationist book never mentions the idea.

Dr. von Fange sees the Fall-Flood world as an extended, grim time of violence on the earth. The earth itself experienced "plastic," tortured upheavals with many mass extinctions (p. 114). In fact, the author suggests the dinosaurs may have already been extinct by the time of the Genesis Flood. This view, although not held by most creationists, is certainly worthy of consideration.

Erich von Fange believes that portions of Genesis were "doubtlessly" originally written by Adam and Noah (p. 22). This questionable, dogmatic statement is balanced elsewhere by a refreshing openness: "We cannot say [concerning a particular creation view] how it was, but . . . how it could have happened" (p. 78). In spite of the book title I was disappointed at the lack of detailed analysis of Job 40-41, as well as the lack of a thorough analysis of other Scripture references to behemoth and leviathan.

The reader will not have every dinosaur question answered in this book. For example, the recent footprint controversy in Paluxy, Texas is not explained. However these shortcomings are met by strengths such as an excellent summary of dinosaur finds including actual (nonmineralized) bones, mummified skin, and stomach contents (p. 108). I also learned two new secular extinction theories: the dinosaurs failed to evolve feathers and caught pneumonia; all the dinosaur eggs hatched as boys so the family tree died out (pp. 111-13)! This book is recommended for anyone who strives to reconcile *Genesis and the Dinosaur.*

Reference

Farlow, J. O., C. V. Thompson, and D. E. Rosner. 1976. Plates of the dinosaur *Stegosaurus;* Forced convection heat loss fins? *Science* 192:1123-25.

An Ice Age *Caused by the Genesis Flood* by Michael Oard. 1990. Institute for Creation Research. El Cajon, CA. 243 pages. $19.95.

Reviewed by Larry Vardiman*

The idea that ice sheets have repeatedly covered the tops of mountains and continental plains at north-

*Don DeYoung is editor of the CRSQ.

*Larry Vardiman, Institute for Creation Research, P.O. Box 2667, El Cajon, CA 92021.

ern latitudes over the past several million years has so captured the imagination of scientists and laymen alike that little effort has been expended in reconciling it with the Biblical account of earth history. Even students of the Bible seem to falter when discussing how an ice age fits with Adam, Noah, and Abraham. The common solution seems to be the allowance of an ice age in the distant past, accommodated with the Bible in a similar manner as the formation of strata, mountains, and fossils in a period prior to Adam or in a gap somewhere in Genesis.

Michael Oard has done a tremendous service to the Creationist community and Biblical Christians, in general, by addressing this issue squarely and presenting the case for a single, recent ice age following a literal world-wide Flood in Noah's time. Mr. Oard follows in the tradition of another meteorologist turned ice-age enthusiast of another time—Alfred Wegener. It is not enough to consider the geology of the ice age; one must also consider the atmospheric conditions which spawn an ice age. Mr. Oard is well qualified to address the atmospheric issues. He received his B.S. and M.S. at the University of Washington, one of the world's leading schools in atmospheric science. He has worked as a forecaster for more than 15 years with the National Weather Service and has written numerous articles on forecasting and ice age theories. In addition to his expertise in meteorology he has become an expert in those areas of geology, paleontology, and climatology which relate to a study of an ice age.

Mr. Oard first reviews the requirements for an ice age, the multitude of theories which have been proposed, and the inadequacy of uniformitarian ice age explanations. He concludes that,

> In summary, the proposed solutions cannot provide the sustained cooling and heavy snow to glaciate northeastern North America under essentially uniformitarian conditions. Modern research shows that much more summer cooling than previously thought is required. Even doubling the normal snowfall is not sufficient (p. 12).

He goes on to say,

> On one hand, extensive glacial deposits cover the surface of mid and high latitude continents, providing undeniable evidence for extensive past glaciation. On the other hand, atmospheric science and related disciplines strongly suggest that an ice age, which depends upon present processes, (uniformitarianism) is nearly impossible. The only other possible solution is with a catastrophic mechanism. Such a mechanism is, by definition, dramatic, and out of the range of normal experience, but many scientists are now convinced that a catastrophic mechanism has much scientific support (p. 20).

Michael Oard then garners the support for a catastrophic ice age. He discusses the conditions on the earth following the Flood of Noah such as the presence of volcanic dust, greater cloudiness, higher albedo, and more stable storm tracks along continental margins. All of these conditions would have contributed significantly to greater snow and ice accumulation in locations consistent with evidence for massive ice sheets. He then defends a single, recent event by critiquing the evidence for old, multiple ice ages. One very interesting subject treated by Mr. Oard is the disappearance of the mammoths by the growth of ice sheets toward the slowly cooling Arctic Ocean. He believes they were trapped by the encroaching ice sheets. (p. 86).

Mr. Oard supports some of his more quantitative arguments with model calculations discussed in appendices. He calculates the growth and melting rates of ice sheets and shows they could easily form and disappear within one thousand years. He also estimates the maximum ice depth.

The Monograph, *An lce* Age *Caused by the Genesis Flood,* published by the Institute for Creation Research of San Diego, California, is probably most controversial for atmospheric scientists when it proposes that the conditions which led to the onset of the ice age were caused by a world-wide upheaval described in the Bible as the Flood of Noah. The transition from a uniform world-wide equable climate to the current warm equator, cold-poles climate is also new territory. However, if warm oceans and cold continents were present, as described by Oard, most atmospheric scientists would likely agree that they would be the primary driving force for an ice age. Mr. Oard recognizes much additional research yet needs to be done, but he has laid out the general framework for future research, much in the manner of what Whitcomb and Morris (1961) did in *The Genesis Flood* for geology.

This monograph is a must for any creationist who would seriously address the geophysical evidence for the "ice ages." For non-creationists, this work is a major piece of evidence that challenges current explanations of earth history. It provides alternative explanations to the standard, non-theistic myths developed in government laboratories and universities which ignore truth revealed in Scripture.

Reference

Whitcornb, J. C. and H. M. Morris. 1961. The Genesis Flood. Presbyterian and Reformed Publishing. Philadelphia.

Is God a Creationist? The Religious Case Against Creation-Science, Edited by Roland Mushat Frye. 1983. Charles Scribners Sons, New York. 205 pages. $15.95.

Reviewed by Clifford L. Lillo*

Frye has gathered together articles written by 11 others and has added two essays of his own. He says,

> The individual authors together represent a broad religious spectrum . . . each is religiously committed to one of the major traditions of Protestantism, Roman Catholicism, or Judaism . . . (p. 1).

He states that he does not wish to present any arguments with respect to the creationist's scientific case because the appraisal of the scientific community:

> . . . is overwhelmingly negative . . . We will therefore not consider that side of the question . . . but will instead concentrate upon the religious issues involved (p. 3).

Such an approach is patently absurd. How can creation science be discussed without considering science?

*Clifford L. Lillo, BEE, M.A., 5519 Michelle Drive, Torrance CA 90503.

Nevertheless, with that as his premise, how well does he do? Most of the book is actually devoted to opposing the scientific premise of creationism, rather than presenting religious issues. In his own section, Frye mentions the creation of the earth by God in six days and says,

> Clearly, the Hebrew word *yom* cannot here be calibrated into a specific chronological measure as creation-science presupposes; it must be understood, not as an inflexible twenty-four hour unit, but as a time of flexible and uncertain duration, within the overall symbolic context of biblical parable (p. 14).

Thus, Frye's basis for argument is not logic, but his own self-proclaimed fiat. He continues in the next paragraph to claim that Job 38 "suggests that the creation occurred on a single morning during which 'the morning stars sang together'" (p. 14). This would be a good example of Scripture interpreting Scripture, were it true. However, a check of Job 38 shows no reference to a single morning.

As to Frye's religious experts, he begins with Edwin A. Olson, a professor of geology and physics. According to Frye's own summary, Olson:

> . . . gives a balanced introduction to the basic issues, defining terms, explaining what constitutes genuine science, and approaching all sides in the controversy with what might best be called an existential sympathy and understanding (p. 31).

What of the religious arguments against creation-science by people from "a broad religious spectrum"? There are no such arguments in Olson's essay. Frye continues with Richard W. Berry, professor of geology. He is identified as a layman prominent in the affairs of the Presbyterian Church (p. 43). Berry, like Olson, presents no religious arguments, but says,

> Creationists find the theory of evolution to be very threatening . . . Exactly why evolution is so threatening is not obvious. Evolutionists intend no threat to the God story (p. 47).

Then Langdon Gilkey, a professor of theology at a divinity school, presents an essay containing,

> reflections on various important issues represented in that case [i.e., overturning of the Arkansas law that required equal time be given to creation-science where evolution was taught in the schools] (p. 56).

Again, no religious arguments against creationism are presented.

Bruce Vawter, author of two books on Genesis and "one of the most widely respected Roman Catholic biblical scholars in America today" (p. 71), presents "a classic and exemplary critique of the arguments for creation-science" (p. 71). Like the others, Vawter presents no religious arguments, but, like Frye, simply makes declarations, portions of which there is no disagreement. For instance, he says,

> The Bible [to the fundamentalist mind] is no longer a source-book for religion, it is primarily a source of knowledge, sacred and profane. . . . in short, a divine encyclopedia of all relevant knowledge dropped down from the heavens as the only righteous guide to life (p. 75, 76).

Certainly, Vawter himself must agree that the Bible *is* the only righteous guide to life. But, the rest of his statement is ridiculous. Does any Christian think of the Bible as *primarily* a source of profane knowledge? Does any Christian think of the Bible as not being a source-book for religion?

Then we come to Davis A. Young, professor of geology, who authored two books* "devoted to separating evangelical theology from young-earth and creation-science theories" (p. 83). He presents no arguments from a religious viewpoint; he simply states:

> . . . the teachings of the creationists are simply not in accord with the facts. . . . Flood geology, which has been endorsed so enthusiastically by some well-meaning Christian leaders, is nothing more than a fantasy. . . . No non-Christian geologist is ever going to accept Flood geology or the young-Earth theory today: the flaws and weaknesses are obvious to any practicing geologist" (pp. 85, 86).

Creationists know that Dr. Henry Morris himself is a geologist who saw the flaws in the old earth theory.

Conrad Hyers, professor of comparative mythology and the history of religions, whose most recent book is *The Comic Vision and the Christian Faith: A Celebration of Life and Laughter* ridicules Biblical liberalism. He says, Biblical liberalism, in its treatment of the days of creation, substitutes a modern arithmetical reading for the original symbolic one (p. 99). However, he too gives no religious arguments.

According to Frye, "Asa Gray (1810-1888) is one of the acknowledged folk heroes of science . . . The only essayist in this anthology who is not still living . . ." (p. 107). Gray, a professor of natural history, gave lectures at Yale Divinity School, and his essay in this book is one of those lectures. What is his argument against creationism? He said,

> Here, it may be remarked that natural selection by itself is not an hypothesis, nor even a theory. It is a truth . . . The *hypothesis* based on this principle is, that the struggle for life and survival of only the fittest among individuals . . . will account for the diversification of the species and forms of vegetable and animal life . . . (p. 111)

Did he present any arguments to substantiate his claim? No, he too merely makes claims with no justification whatever.

Owen Gingerich, professor of astronomy and of the history of science, in a 1982 lecture here reproduced by Frye, described,

> . . . the scientific scenario . . . for the first moments of creation. . . . The physics ultimately fails as the nucleo-cosmologists push their calculations back to Time Zero but they get pretty close to the beginning, to 10^{-43} second (p. 121).

The most important point in this paragraph, and in his whole lecture, is that clause, "The physics ulti-

*Editor's Note: See *Science, Scripture and the Young Earth* by H. M. Morris and J. D. Morris for a rebuttal of many of Davis Young's arguments. Book review of this book in the Quarterly is CRSQ 27:110-11.

mately fails . . .“ With that creationists can agree, and that puts the whole concept of the “Big Bang” in the mythological zone.

Nahum M. Sarna is called by Frye. “One of the most eminent Hebraic scholars in America today” (p. 115). Sarna quotes from Genesis and says,

> The account culminated in the Sabbath, or divine cessation from creation which, to the Torah, is as much a part of the cosmic order as is the foregoing creativity. . . . It should be obvious that by the nature of things, none of these stories can possibly be the product of human memory, nor in any modern sense of the word scientific accounts of the origin and nature of the physical world. . . . Hence, it is a naive and futile exercise to attempt to reconcile the biblical accounts of creation with the findings of modern science (p. 156).

Why does Sarna waste the reader’s time? If he does not acknowledge first of all that the Bible is the word of God, then that ends the discussion. Every creationist scientist will readily agree that if God did not inspire the Biblical writers, then anything written about the origin of the heavens, the earth, and all that is therein is myth. Thus, Sarna has not presented any arguments at all against creationism and his essay does not belong in this book,

Another "widely recognized master of Old Testament study," according to Frye, is Bernhard W. Anderson. In an essay first published in 1955, Anderson brings in the much discredited J and P concept which claims that different authors contributed to the writing of Genesis, and because of that we today must refuse to accept it as the words of Moses or of divine inspiration. Anderson is the only writer in the whole book who quotes extensively from the Bible, but he, like several of the others, does not believe that the creation account was inspired by God. Rather it was simply an account written by naive humans.

Nowhere in any of these articles has a religious case against creation-science been given. There is one other specialist, the Roman Catholic Pope, John Paul II. In two sections called, "Faith, Science and the Search for Truth," and "Science and the Church," the pope expounds at length about science but not about creation-science. Finally, in a third section, he states.

> The Bible itself speaks to us of the origin of the universe and its makeup, not in order to provide us with a scientific treatise, but in order to state the correct relationships of man with God and with the universe. Sacred scripture wishes simply to declare that the world was created by God, and in order to teach this truth it expresses itself in the terms of the cosmology in use at the time of the writer. . . . Any other teaching [in the Bible] about the origin and makeup of the universe is alien to the intentions of the Bible, which does not wish to teach how heaven was made but how one goes to heaven (p. 153).

What Scripture passages does the pope use to explain his position? None. He simply says, “Science cannot of itself solve this question [i.e., the universe’s beginning] . . . there is needed above all the knowledge that comes from God’s revelation” (p. 53).

It becomes obvious that Frye has failed miserably in his attempt to present the religious case against creation-science. True, he has quoted some scientists who make a god of science, and from some religious people who are not in agreement with a literal interpretation of the Bible. However, he has not presented a case from a logical standpoint nor from the position of letting Scripture interpret Scripture.

LETTERS TO THE EDITOR

Reply to Gentry

The most reasonable conclusion from the scientific data at hand is that “'radioisotope half lives and basic laws' have not changed 'over the time geological formations have been in existence.'“ Let us face the facts and accept the restriction that a contrary view must depend on inspired or eyewitness testimony, just as neighbors or husbands who were not on the Galilean hillside with Jesus had to (and we also have to) accept the testimony reported in Matthew 14:20, Mark 6:43, Luke 9:17, and John 6:13 concerning 12 baskets of fish and bread. No analysis based on the techniques of physics, chemistry, or biology will prove the validity of these accounts.

We can each be thankful that God is a uniformitarian, that we can depend on His activities, that we can "do science." And we should be grateful that He departs from a uniform pattern whenever His judgment and love indicates that the universe would be better served by a nonuniform development.

Radiometric “ages” tell something about the mineral in which an organism was buried, but do not necessarily specify *when* the burial occurred, any more than radiometric data for soil and rocks in a cemetery specify the dates of interment. Fission track ages are not made invalid by contamination; but they may be modified by annealing. If properly corrected for annealing loss, a fission track age might relate to a pattern produced at initial creation, and/or the passage of time since a creation event. [Many Biblical creationists hold closely to God’s definitions in Genesis 1:8-10, and allow for the possibility that His creative activities have extended over a universe of both time and space.] There is no restriction concerning the fission track “age” characteristics of minerals with which or under which plants and animals were buried as a result of the Flood.

In developing my paper on constancy of natural law, I endeavored to maintain a phenomenological, descriptive treatment, and avoid dependence on any theoretical model other than acceptance of the evidence for both short and long range forces between nucleons in an atomic nucleus. I endeavored to base my conclusions on the same *observations* that quantum mechanical theory seeks to "explain."

I regret if anyone interprets my statement concerning association of polonium halos and complete uranium halo sets to specify their appearance together in

most fields of microscopic view. The remarkable Spectacle Halo (Gentry, et al., 1974; *Nature* 252:564) impressively demonstrates that microscopic regions may have a concentration of polonium halos alone. But complete uranium radiohalo sets *are* present in minerals which contain polonium radiohalos, sometimes sufficiently closely associated to be overlapping. Polonium halos are only found in minerals which are also characterized by association with uranium. Only one clearly identified association between a uranium radiohalo set and an isolated polonium radiohalo ring or set within the same field of microscopic view is a fact of nature that calls for explanation in harmony with the explanations proposed for all other associated observations.

That there are radiohalo rings whose radii correlate with polonium alpha-particle energies and which have no polonium at their center is unquestioned. That the same minerals may also contain uranium radiohalo sets has also been amply demonstrated. Uranium atoms are always located as an impurity (foreign) concentration at the center of such rings. As far as I have been able to determine, the process by which uranium was located as a crystal lattice impurity at distinct and separated locations is not understood. There is a similar lack of understanding regarding the distinct and separated previous locations of polonium that are identified by polonium halos. With this deficiency in our understanding, I do not see a basis for affirming that polonium was never deposited at a location which had received, or was simultaneously receiving, uranium. Nor do I see a basis for affirming that uranium could not have been deposited at a polonium halo center. Either case would produce a uranium ring set with excessively dark polonium rings.

Perplexity over the apparent variation in the density pattern from inner to outer ring among uranium radiohalo sets has led me to this consideration. I thought it was worth a passing mention in discussion of evidence concerning the constancy of natural process rates. What other evidence might there be for coincident or subsequent polonium accumulation at uranium radiohalo ring set centers? I find nothing in *Science* 184:64-66 (1974) as referenced by Gentry or in any other investigative report, that excludes the possibility of an enriched or independent deposit of polonium at a uranium radiohalo center site. Whether such combined deposit has or has not occurred, radiohalos do provide evidence for essential constancy of basic natural process rates.

As a conclusion to these brief comments, I want to express my appreciation for Robert Gentry's collection of data on the fascinating phenomena of radiohalos, and my commendation for his commitment to the support and promotion of Biblical creationism.

Robert H. Brown
12420 Birch St.
Yucaipa, CA 92399

The Fall of Evolution*

Cooperative efforts between the Soviet Union and the U.S. in the recent Kuwaiti crisis remind us of the speed of change occurring in a single year throughout the world. Even skeptics regard the apparent failure of communism, long thought of as an inadequate portrayal of man, as genuine. What contributed to the fall of communism and to the discredit of socialism in general? What changes may be ahead for our own society? Certainly many things have contributed to the disinterest in revolutionary socialism, and certainly many changes are to be expected. Yet one thought is largely ignored.

The philosophic concept, rooted in modern thinking, both in the East and West, having given rise to socialism since the time of Karl Marx (1818-1883), has also been the undoing to that inadequate, oppressive world view. Marx and Engles put *The Communist Manifesto* on paper in 1848. Darwin and Wallace, providing the philosophic underpinnings, did not go into print with the theory of evolution by natural selection until ten years later. Nevertheless, seizing upon Darwinism as an antidote to traditional Christianity, Marx saw a "scientific" justification for his view of man as weak, beguilable, easily led. At one point he even offered to dedicate a later edition of *The Manifesto* to Darwin.

Here is the problem evident in neoteric world-life views: man is gullible, open to manipulation by an elite. In the West, Darwinism and the various successor theories—gradualism, punctuationalism—have given rise to the biological and social ideas of Jacques Monod, Francis Crick, and B. F. Skinner. Moving from Darwin, each has characterized the world as motivated by mindless chance. Taking biologic evolution to its logical conclusion, Skinner, the behaviorist who taught manipulation as the only recourse in life, promoted the abolition of autonomous man. Against this idea the people of the Eastern Block nations have arisen.

It is now understood, though evolutionism still holds enormous influence in both the East and the West, its portrayal of man, its inability to provide an answer as to why man *should* have dignity or *has* dignity at all, has been a giant intellectual failure. Indeed, if this philosophy were truly lived out by its proponents—as Skinner attempted—values such as equity, equality, compassion, community, law would not, ought not to exist. Why should they exist? As Skinner suggested: "To man *as* man we readily say good riddance.'

The point of tension in this philosophy is that proponents, especially the university academic and intellectual, refuse to live in a place of consistency in their system *and* the real world. Modern men and women must be brought to face the logical conclusions of their non-Christian presuppositions. A view of the world incapable of providing answers for *why* man is capable, worthy of dignity, individual distinction, or respect, yet simultaneously retaining a "belief" in cosmic optimism, is doomed to failure. The philosophic inconsistency of biologic evolution is a glaring warning to adherents.

After the fall of communism, expect the collapse of the biological-evolutionary world-life view.

Allen Bartlet
Department of Geology
Baylor University
Waco, TX 76798

*Editor's note: This letter is reprinted by permission from *The Lariat*, a Baylor University publication.

The Dry Land—A Creative Act?

"Let the dry (land) appear" Genesis l:9b.

". . . His hands formed the dry (land)" Psalm 95:5.

While our concepts as to the interior structure, state and composition of the Earth must remain matters of inference, we do have considerable direct, observable, factual information about the crust. In particular, we know that the crust under the oceans differs markedly from the continental crust. To quote one author, "The continents are not simply elevated sections of a uniform crust; they differ fundamentally from the low-lying ocean basins" (Trewartha, et al., p. 203). These differences may be defined as:

Depth: Estimates of depth average 32-40 km for the continental crust and 6-7 km for the oceanic crust.

Composition: The continental crust is granitic, silicon and aluminium dominating—SIAL; the oceanic crust is basaltic, silicon and magnesium dominating—SIMA.

Density: The continental crust density is $2.7 g/cm^3$; the oceanic crust $3.0 g/cm^3$.

Further, it is generally agreed that the SIMA layer is continuous and that the discrete SIAL masses float on top of denser SIMA; much as a piece of low density wood would float on a piece of higher density wood in water. How this came to be is a matter of conjecture in geologic circles.

> Little is known about the origin of the extensive 'rafts' of granitic rocks that form the continents. . . . Why the low density granitic crustal material should be concentrated in large patches that occupy only a third of the Earth's surface remains a mystery. . . . It remains true that neither the existence nor the pattern of occurrence of the largest of all geographic features—the continents, ocean basins, and the great mountain belts—can at present be accounted for with any certainty (Trewartha, et al., pp. 204, 218-219).

Of course, the 'mystery' as such is seen against the background of mainline geologic assumptions regarding origins: most, if not all, theorizing starts at the point of a shrinking and cooling Earth and the existence of convectional currents in the mantle. That these assumptions conflict with the evidence is plainly apparent. The mystery of the continents compares in magnitude with another mystery: the eternal optimism of some scientists that continual investigation will, in the end, win through to explain in acceptable and traditional terms what is plainly unexplainable. The alternative of the Genesis account is discarded as fable for the uninformed. But the Scripture is plainly informative nevertheless; Genesis 1:9 and Psalm 95:5 report that God (Elohim) not only commanded the dry (land) to appear (Hebrew 'raah') but formed it with His hands!

The Hebrew 'raah' is used in the Masoretic text 66 times. The following is a summary of this usage grouped into five categories.

- Appearances of the Lord to man 38 references
- Appearances of man before the Lord 15 references
- Appearances in visions (Ezekiel) 7 references
- Appearances on a man's face-shame, etc. 3 references
- Creative appearances 3 references

It is clear from this summary that implicit in the meaning of 'raah' is the idea of coming from the spiritual to the physical or vice versa. In other words, creative acts. The use of 'raah' in Genesis 1:9 can be taken as an encouragement that the granitic rafts resulted, not from some minor adjustment to the initial creative act but from a special creative act on Day Three. The granitic rafts are there because God made them appear.

Reference

Trewartha, G. T., A. H. Robinson and E. H. Hammond. 1967. Elements of geography. McGraw Hill. New York.

John Potter
Mont de Diew Educational Services
P.O. Box 2503, White River
Republic of South Africa 1240

Archaeopteryx and a Cornish Rock

I could kick myself hard now because we ate the evidence! Last year I obtained a large, white, young rooster. He looked like a Cornish Rock but was huge, though just a few weeks old. The chicken was actually a Peterson-Hubbard cross variety. My idea was to use him as a breeder in our tiny family flock so we might raise eating chickens. He was so docile that the hens drove him into a corner. Since we had other chickens, I decided I would not finance his appetite but rather would feed him to our family.

Noticing he had claws on his wings I laughed to myself, remembering *Archaeopteryx* and the description that fossil feathers appeared similar to chicken feathers. Apparently, all Cornish Rock chickens have claws on their wings, like *Archaeopteryx*.

I decided to order a bunch of chicks this year and take pictures. Cornish Rock is a new breed for me; and now that I have begun to look for a hatchery, I realize that my bird was rare. He was given to a person in Gonzales, Texas, by a local hatchery, and was a cull. We are searching for another such chicken. If successful, I want it in the hands of someone who is doing research in this area.

The wing of my "Archie" had a digit with a claw attached to the outside of the first joint of the wings. It curled inward toward his face. When relaxed it lay in line with the wing, pointing toward the tip of the wing. He seemed to draw the claw in or extend it at will and even appeared to use it, along with his wings, as a defense.

Mrs. Rebecca J. Gring
P.O. Box 616
Pearsall, TX 78061

REMEMBER

The Creation Research Society Laboratory Project

Send tax deductible donation to:
C.R.S. LABORATORY PROJECT
1306 Fairview Road
Clarks Summit, PA 18411

Information available at the same address

HELP US ESTABLISH THE CREATION MODEL OF SCIENCE

A chemical formula, let us say NaCl, is a definition with a convenient and specific yet a limited and finite meaning: a law about the cause or composition of something. This somethig has unit molecules in the creation of which a unit atom of Na joined with a unit atom of Cl. But that is intolerably bare. How did the atoms unite? What united them? Resting on what ground were they when they united? In what busy little world did the atoms pursue their private businesses when they came into contact? What attendant circumstances made the moment of union a rich circumstantial moment, as moments to our actual observation sometimes are? The scientist cannot get this detail into his formula NaCl: so he indicates it with a gesture. He points to it when he utters the mystic word: Substance! The doctrine of substance is a mythical one which says: Under every NaCl is a ground which supports it and provides it with plenty of accessory detail; but do not look for it; I am only supposing it. *(Substance* is that which stands under and *supposition* is the act of putting it under; my supposition is the origin of yonder substance.)

This will read perhaps as rather metaphysical and difficult. Many scientists are capable of talking mysteriously about Substance without seeing that they have to suppose it. The act of supposition is a perfectly human one, but often only a half-conscious one.

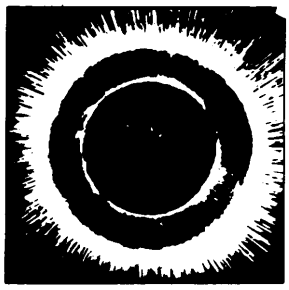
Ransom, John Crowe. 1965. *God Without Thunder.* Archon Books, Hamden, CT. pp. 69-70.

For postage charges, see next page

CREATION RESEARCH SOCIETY BOOKS

Available At:
P.O. Box 14016, Terre Haute, IN 47803

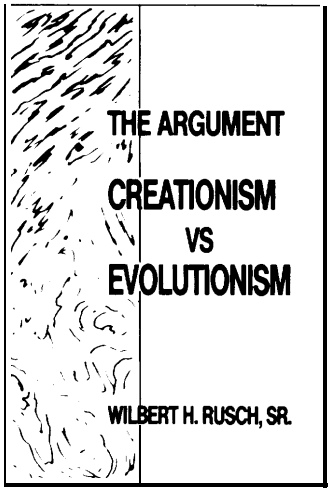
Add 10% of total order for postage up to a maximum of $5.00



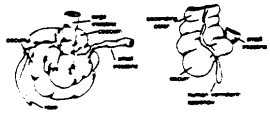
Thermodynamics and the **Development** Order

Edited by Emmett L. Williams

A Definitive Creationist Study on the Implications of Thermodynamics in the Creation/Evolution Controversy 141 Pgs.
ISBN: 0-940384 -01-9 $8.95

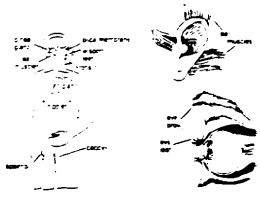


Topics Include Limits of Variation, Fossils, Age of the Earth, and Needed Definitions in the Continuing Creation/Evolution Debate. 86 Pgs.
ISBN: 0-940384 -04-3 $8.95



"Vestigial Organs" Are Fully Functional

Jerry Bergman, Ph.D. and George Howe, Ph.D.



Answers to A "Proof" of Evolution Still Found in Textbooks 95 Pgs.
ISBN: 0-940384 -09-4 $10.95

Why Not Creation?

Edited by WALTER E. LAMMERTS

Selected Articles from the Creation Research Society Quarterly (Volumes 1-5, 1964-1968).
ISBN: 0-8010 -5528-8
388 Pgs. $9.95

DID CHARLES DARWIN BECOME A CHRISTIAN?

by
Wilbert H. Rusch, Sr.
and
John W. Klotz

Edited by Emmett L. Williams

A True Account of Darwin's Last Days
ISBN: 0-940384-05-1
38 Pgs. **$3.95**

Design and Origins in Astronomy

Edited by George Muffinger, Jr.

The Latest Creationist Thinking on the Origin of the Universe—A Challenge to Modern Materialistic Thought.
ISBN: 0-940384-03-5
152 Pgs. **$8.95**

Speak to the Earth

CREATION STUDIES IN GEOSCIENCE

Edited by GEORGE F. HOWE

Selected Articles on Geoscience from the Creation Research Society Quarterly (Volumes 6-10, 1969-1974)
ISBN 0-940384-07-8
463 Pgs., 144 Illust. $13.95

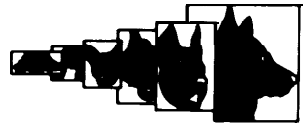
Creationist Research (1964-1988)

Duane T. Gish

Research reported in the Quarterly for 24 years. 32 Pgs.
ISBN: 0-940384-06-X $4.95

VARIATION AND FIXITY IN NATURE

FRANK L. MARSH PH.D.



THE MEANING OF DIVERSITY AND DISCONTINUITY IN THE WORLD OF LIVING THINGS, AND THEIR BEARING ON CREATION AND EVOLUTION

ISBN: 0-940384 -02-7
150 Pgs. **$7.95**

Scientific Studies In Special Creation

Edited by WALTER E. LAMMERTS

More Selected Articles from the Creation Research Society Quarterly (Volumes 1-5, 1964-1968). 343 Pgs.
ISBN: 0-940384 -08-6 $9.95

See Inside Back Cover for More Book Offers

Use Credit Card to Order Books (Application Blank)