

The Scientific Evidence for Creation

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The Nature of Theories on Origins

In order for a theory to qualify as a scientific theory it must be supported by observations that are repeatably observable and the theory must, in principle, be falsifiable. That is, there must be some way to demonstrate that the theory is false if indeed it is false. Neither creation nor evolution fulfils the criteria of a scientific theory. There were no human observers to the origin of the universe, the origin of life, or to the origin of a single living thing. These events occurred in the unobservable past and are not repeatable in the present. Creation and evolution are inferences based on circumstantial evidence. They are theories about history. Stephen Jay Gould, Harvard professor and a leading spokesman for evolutionary theory today, states that "Evolutionary biology is a quintessential historical discipline" and he pays great honor to evolutionist Ernst Mayr as a "great historical scientist."¹

Is an evolutionary event observable, even repeatably observable? Theodosius Dobzhansky, a famous evolutionist, has said,

Those evolutionary happenings are unique, unrepeatable, and irreversible. It is as impossible to turn a land vertebrate into a fish as it is to effect the reverse transformation. The applicability of the experimental method to the study of such unique historical processes is severely restricted before all else by the time intervals involved, which far exceed the lifetime of any human experimenter. And yet it is just such impossibility that is demanded by anti-evolutionists when they ask for "proofs" of evolution which they would magnanimously accept as satisfactory.²

Dobzhansky thus stated that the applicability of the experimental method to evolution is an "impossibility." One reason given by Dobzhansky and other evolutionists for rejecting creation as a possible explanation for origins is because it is not subject to the experimental method. At the same time, however, they consider it wholly unreasonable for creationists to place the same demand on evolution theory!

Drs. Paul Ehrlich and L. C. Birch, biologists at Stanford University and the University of Sydney, respectively, summarized the problem in *Nature*, the journal published by the British Association for the Advancement of Science:

Our theory of evolution has become...one which cannot be refuted by any possible observations. Every conceivable observation can be fitted into it. It is thus "outside of empirical science" but not necessarily false. No one can think of ways to test it. Ideas, either without basis or based on a few laboratory experiments carried out in extremely simplified systems have attained currency

¹ Stephen J. Gould, *Science* 223 (1984): 255.

² Theodosius Dobzhansky: "On Methods of Evolutionary Biology and Anthropology," *American Scientist* 45 (December 1957): 388.

far beyond their validity. They have become part of an evolutionary dogma accepted by most of us as part of our training.³

What Ehrlich and Birch are saying is that evolution theory has become so plastic that it no longer makes any difference what the data may be, there will be some way to fit the data into the theory. The theory thus is untestable and consequently non-falsifiable. And, of course, dogma is supposed to be a property of religion, not science.

An example of evolution often taught to students is the change in populations of peppered moths in England from a predominantly light, speckled colored variety to a predominantly melanic, or dark colored variety, due to a progressive darkening of tree trunks on which the moths supposedly rest. This occurred as a result of the increase in pollution due to the industrial revolution. It has been characterized by evolutionists as the most astounding example of evolution ever seen by man. Of course, it is not evolution at all. The moths were peppered moths, *Biston betularia*, before the industrial revolution, and they all remain peppered moths, *Biston betularia*, today. The variations that are actually observable today, and which Darwin cited in this book as evidence for evolution, are changes within a species. No one has ever observed one basic kind of plant or animal naturally change into another basic kind.

Is evolution theory falsifiable? The theory has become so plastic that no matter what the data are, they can be made to fit the theory. More and more evolutionists are becoming aware of this flaw in modern evolution theorizing. For example, evolutionist Murray Eden, an MIT professor, has stated,

This cannot *be done in evolution*, taking it in its broad sense, and this is really all I meant when I called it *tautologous* in the first place. *It can, indeed, explain anything*. You may be ingenious or not in proposing a mechanism which looks plausible to human beings and mechanisms which are consistent with other mechanisms which you have discovered, but it is still an unfalsifiable theory.⁴ [emphasis added]

Thus evolution, that is, the amoeba-to-man theory, cannot be observed and the theory is non-falsifiable. It thus fails to satisfy the criteria of a scientific theory. The same can be said of creation theory. We do not see God creating anything today, and as a theory, creation is non-falsifiable. Nevertheless, one or the other must be true. Furthermore, each can be used as a scientific model and discussed in scientific terms. We do have circumstantial evidence against which each theory can be compared—the fossil record, the laws of thermodynamics, the laws of probability, evidence of design and purpose, etc. After that is done then, the question can be asked, “Which model of origins, creation or evolution, do the data fit best?”

But, isn't creation religion? Isn't it true that the supernatural must be excluded from science? On the other hand, isn't evolution, since it excludes the supernatural, at least qualified as a scientific model? It is true that in experimental, observational science in which we are investigating objects, events, and processes in the real world—how the sun

³ Paul Ehrlich and L. C. Birch, *Nature* 214:352 (1967).

⁴ M. Eden, in *Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution*, ed. P. S. Moorhead and M. M. Kaplan, (Philadelphia: Wistar Institute Press, 1967), p. 71.

produces its energy, the mechanics of the solar system, the cause and products of supernovae explosions, our biochemistry, physiology, etc.—we employ only natural laws and processes. This is the only way a scientist can operate when he seeks to observe and explain the *operation* of the present universe. The evolutionist, however, insists that we must not only use natural laws and processes to explain the *operation* of the universe and its living organisms, but that we must use those same natural laws and processes to explain the *origin* of the universe and the living organisms it contains. In doing so, he steps outside the limits of empirical, observational, testable science. He is insisting on the strict application of his worldview. Richard Lewontin, evolutionist and Harvard professor of biology, in his introduction to the anti-creationist book, *Scientists Confront Creationism*, states that,

Yet, whatever our understanding of the social struggle that gives rise to creationism, whatever the desire to reconcile science and religion may be, there is no escape from the fundamental contradiction between evolution and creationism. They are irreconcilable world views.⁵

Thus, Lewontin states that evolution and creation are irreconcilable *world views*. One's world view involves one's sense of reality—what lies beyond or prior to the physical universe—Is there something supernatural or transcendental beyond the physical universe, or is there nothing? Is the possibility or conviction that a creator exists more religious than the belief that no creator exists? Both views are metaphysical, thus basically religious. This has been emphasized by Phillip Johnson, University of California professor of law, in his book, *Darwin on Trial*.⁶

Evolutionist Douglas Futuyma states,

By coupling undirected, purposeless variation to the blind, uncaring process of natural selection, Darwin made theological or spiritual explanations of the life processes superfluous. Together with Marx's materialistic theory of history and society and Freud's attribution of human behavior to influences over which we have little control, Darwin's theory of evolution was a crucial plank in the platform of mechanism and materialism—of much of science, in short—that has since been the stage of most Western thought.⁷

In other words, the trilogy of Darwinian evolution—Marx's materialistic theory of economic and political history, and Freudian psychology—is now the predominant mechanistic materialistic world view in Western academia.

Michael Ruse, an evolutionist and a philosopher of science professor, now at Florida State University, was one of the main witnesses for evolution in the 1981 Arkansas federal trial concerning the constitutionality of the equal time law for creation and evolution passed by the Arkansas legislature (declared unconstitutional by Judge William Overton). At that time he argued strenuously

⁵ Laurie R. Godfrey, ed., *Scientists Confront Creationism* (New York: W. W. Norton and Co., 1983), p. xxvi.

⁶ Phillip E. Johnson, *Darwin on Trial*, 2nd ed. (Downer's Grove, Illinois: Intervarsity Press, 1993).

⁷ D. J. Futuyma, *Evolutionary Biology*, 2nd ed. (Sunderland, MA: Sinauer Associates, Inc., 1986), p. 2.

that evolutionary theory was science free of any religious implications while creation theory was exclusively religious. This served as the main basis for Judge Overton's decision.

Twenty years later, after being challenged that evolutionary theory is as religious as creation and devoting much study concerning this problem, Dr. Ruse revealed that, even though he is still a Darwinian evolutionist, concerning the religious status of evolutionary theory, he had changed his opinion 180 degrees. In an article published in the *National Post*, a Canadian newspaper, May 13, 2000, he states that "Evolution is promoted by its practitioners as more than mere science. Evolution is promulgated as an ideology, a secular religion—a full-fledged alternative to Christianity, with meaning and morality ... **Evolution is a religion.**" In his recent book on this subject he states, "My area of expertise is the clash between evolutionists and creationists, and my analysis is that we have no simple clash between science and religion but rather between two religions."⁸

The religious nature of evolution had been made clear earlier by such proponents as Julian Huxley and Jacob Bronowski. They have said, for example:

A religion is essentially an attitude to the world as a whole. Thus evolution, for example, may prove as powerful a principle to coordinate man's beliefs and hopes as God was in the past.⁹

The Jesuit priest, Fr. Pierre Teilhard de Chardin, well known for his involvement with Piltdown Man (the latest research indicates he was not involved with the fraud) and Peking Man fossils, stated that,

Is evolution a theory, a system or a hypothesis? It is much more: it is a general condition to which all theories, all hypotheses, all systems must bow and which they must satisfy henceforward if they are to be thinkable and true. Evolution is a light illuminating all facts, a curve that all lines must follow.¹⁰

Nothing could be more religious than this. But, you might say, Teilhard de Chardin was a priest, not a leading evolutionary scientist. But in his eulogy to Theodosius Dobzhansky, evolutionary biologist Francisco Ayala stated that according to Dobzhansky the place of biological evolution in human thought was best expressed in the passage by Pierre Teilhard de Chardin quoted above.¹¹ George Gaylord Simpson, world-famous evolutionary paleontologist, also quoted favorably this statement by de Chardin.¹²

Nevertheless, does the teaching of the non-theistic mechanistic theory of evolution constitute a challenge or threat to traditional theistic religious commitments? The Harvard professor, Richard Lewontin, certainly believes so. In his Introduction to *Scientists Confront Creationism* (ref. 5), Lewontin states (p. xxv),

⁸ Michael Ruse, *The Evolution-Creation Struggle*. Harvard University Press, Cambridge, MA 2005, p. 287

⁹ Julian Huxley and J. Bronowski, *Growth of Ideas* (Englewood Cliffs: Prentice-Hall, Inc., 1968), p. 99.

¹⁰ Pierre Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper and Row, 1965), p. 219.

¹¹ F. J. Ayala, *Journal of Heredity* 68 (1977): 3-10.

¹² George G. Simpson, *This View of Life* (New York: Harcourt, Brace and World, Inc., 1964), p. 225.

Suddenly the study of evolution was in all the schools. The culture of the dominant class had triumphed, and traditional religious values, the only vestige of control that rural people had over their own lives and the lives of their families, had been taken from them.¹³

This is what occurred, according to Lewontin, following the widespread adoption of the Biological Sciences Curriculum Study series of high school biology books, which are evolutionary throughout. Note particularly that Lewontin states that this constituted a triumph of the *culture* of the dominant class over *traditional religious values* of the rural people. When students are taught that everything in the universe was produced by a series of strictly mechanistic processes starting with the hydrogen and helium gases produced by a hypothetical big bang, this does encourage a belief in a no-God philosophy and set of values.

In conclusion, it can be stated that neither creation nor evolution is a scientific theory and thus evolutionary theory is no more scientific than creation theory. Furthermore, evolution theory is just as religious as creation theory. The teaching of the theory of evolution exclusively, as is being done in most of our tax-supported public schools in the United States, violates the separation of church and state and violates the academic freedom of teachers and students. It is recommended that all of the scientific evidence supporting each of these two opposing theories, devoid of references to, or use of, any religious literature, be presented in our tax-supported public schools in an unbiased manner, allowing the students to decide for themselves which model of origins, creation or evolution, do the data fit best. That would be good science and good education. This can be done fully in accord with the U.S. constitution, even according to leading evolutionists, as thoroughly documented in my book, *Teaching Creation Science in Public Schools* (see Bibliography). The truth is, evolutionists nearly completely dominate our educational system, the scientific establishment with its control of what is published in its journals, and the mass media with its control over what is published in our newspapers and magazines and what goes out over radio and television. It is extremely difficult for creation scientists to obtain a hearing for their position. The results are predictable. Thus, Stephen Jay Gould frankly admitted this when he said:

Many advantages accrue to the victors of any dispute, military or cerebral—and chronicling rights must rank among the greatest of perks. In short, the winners write history. How would we interpret the Trojan War if our main account had been written by Hector's bard; and how would future generations view the history of evolutionary theory if Duane Gish and Henry Morris (our most vociferous modern creationists) cornered the market for written descriptions?¹⁴

¹³ Richard Lewontin, *Scientists Confront Creationism*, ed. Laurie Godfrey, (New York: W. W. Norton & Co., 1983).

¹⁴ S. J. Gould, *Natural History* (November 1995), p. 12.

*Summary of the Scientific Evidence***The Fossil Record**

The fossil record constitutes some of the most important evidence concerning origins. It is the history of life written in the rocks. If evolution theory is true, the fossil record must be what this theory requires, and on the other hand, if creation is true, the fossil record must be in accord with that theory. Evolutionists Glenister and Witzke state that "The fossil record affords an opportunity to choose between evolutionary and creationist models for the origin of the earth and its life forms."¹⁵ Futuyma expresses a similar belief when he said,

Creation and evolution, between them, exhaust the possible explanations for the origin of living things. Organisms either appeared on the earth fully developed or they did not. If they did not they must have developed from preexisting species by some process of modification. If they did appear in fully formed state, they must have been created by some omnipotent intelligence. . . .¹⁶

If evolution is true, then millions of species have evolved during hundreds of millions of years as each species developed from some preceding form and in turn gave rise to a succeeding form. Furthermore, evolutionary doctrine holds that evolution proceeds by the survival of the fittest, and the fittest are defined as those that reproduce in larger numbers. Thus, the population of each intermediate species would be considerably large and would exist for tens of thousands to several millions of years. As a result, enormous quantities of the transitional forms generated by evolution would have lived and died during that vast stretch of time. If evolution is true, our natural history museums should contain large quantities of undoubted transitional forms. The evidence for evolution should be obvious, even for the untrained eye to see.

On the other hand, if creation were true, we would expect to find a very different kind of record among the fossils. We would expect to observe that each basic kind of plant and animal, each basic morphological design, would appear fully formed with no series of transitional forms revealing an origin from some other basic type. Cats were always cats, dogs were always dogs, monkeys were always monkeys, and humans were always humans. We would expect to see variation within each kind—many varieties of finches, as Darwin noted in the Galapagos Islands. Nevertheless, as creation scientists point out, the finches are not only still birds, they are still finches, and interbreed with one another. To believe that finches, canaries, ducks, eagles, hummingbirds, etc., evolved from a common ancestor which evolved from a reptile requires a great leap of faith not documented by the fossil record.

From the very beginning, the fossil record contradicts evolution but presents the evidence predicted based on creation. Darwin was aware of the fact that the fossil record did not produce the evidence his theory predicted, but he hoped future generations would

¹⁵ B. F. Glenister and B. J. Witzke, in *Did the Devil Make Darwin Do It?* Ed. D. B. Wilson, (Ames: Iowa State University Press, 1983), p. 58.

¹⁶ D. J. Futuyma, *Science on Trial* (New York: Pantheon Books (1983), p. 197.

unearth the required evidence. This has not happened. Evolutionist Dr. David Raup, professor of geology at the University of Chicago, states,

The evidence we find in the geologic record is not nearly as compatible with darwnian natural selection as we would like it to be. Darwin was completely aware of this. He was embarrassed by the fossil record because it didn't look the way he predicted it would and, as a result, he devoted a long section of his *Origin of Species* to an attempt to explain and rationalize the differences. . . . Darwin's general solution to the incompatibility of fossil evidence and his theory was to say that the fossil record is a very incomplete one. . . . Well, we are now about 120 years after Darwin and the knowledge of the fossil record has been greatly expanded. We now have a quarter of a million fossil species but the situation hasn't changed much. The record of evolution is still surprisingly jerky and, ironically, we have even fewer examples of evolutionary transition than we had in Darwin's time. By this I mean that some of the classic cases of darwinian change in the fossil record, such as the evolution of the horse in North America, have had to be discarded or modified as a result of more detailed information—what appeared to be a nice simple progression when relatively few data were available now appears to be much more complex and much less gradualistic. So Darwin's problem has not been alleviated. . . .¹⁷

Earlier, evolutionist David Kitts, professor of geology at the University of Oklahoma, expressed the same view.

Despite the bright promise that paleontology provides a means of "seeing" evolution, it has presented some nasty difficulties for evolutionists the most notorious of which is the presence of "gaps" in the fossil record. Evolution requires intermediate forms between species and paleontology does not provide them. The gaps must therefore be a contingent feature of the record. Darwin was concerned enough about this problem to devote a chapter of the "Origin" to it. He accounts for "the imperfections of the geological record" largely on the basis of the lack of continuous deposition of sediments and by erosion. Darwin also holds out the hope that some of the gaps would be filled as the result of subsequent collecting. But most of the gaps were still there a century later and some paleontologists were no longer willing to explain them away geologically.¹⁸

As we will see, just as paleontological research during the 125 years between publication of Darwin's book and these publications failed to alleviate Darwin's problem with the fossil record, neither has paleontologists improved the situation in the two decades since publication of these reports.

The fossils of a vast array of complex invertebrates abruptly appear fully formed in the so-called Cambrian rocks. Evolutionists believed a few years ago that these Cambrian

¹⁷ D. M. Raup, *Field Museum of Natural History Bulletin* 50 (1979): 22.

¹⁸ David Kitts, *Evolution* 28 (1974): 467.

rocks began to form about 600 million years ago. Now geologists are telling us that these rocks began to form no more than 520-530 million years ago, and that the duration of what is called the Cambrian period was only about 5-10 million years rather than their earlier estimate of 80 million years. These fossils include those of clams, snails, trilobites, brachiopods, jellyfish, sponges, worms, etc. Billions times billions of fossils of these creatures are found in Cambrian rocks on every continent of the world. These animals supposedly evolved beginning with microscopic, single-celled creatures. Lying generally underneath the Cambrian rocks are what are called Precambrian rocks. Evolutionists believe Precambrian rocks were laid down during hundreds of millions of years preceding and leading up to the Cambrian Period. If evolution is true, these Precambrian rocks should contain billions times billions of fossils of the evolutionary ancestors of the complex invertebrates. Furthermore, we must find fossils of transitional forms linking these complex invertebrates to common ancestors. Many of the Precambrian rocks are undisturbed and perfectly suitable for the preservation of fossils. If the fossils were there, they would be found. There are now many reports in the scientific literature of the discovery of fossils of microscopic, soft-bodied, single-celled organisms, such as bacteria and algae, in Precambrian rocks. If fossils of such creatures can be found it is obvious that there would be no difficulty in finding fossils of the evolutionary ancestors and transitional forms leading up to the complex invertebrates whose fossils are found in Cambrian rocks. No one, however, has found fossilized ancestors for a single one of the Cambrian invertebrates, or transitional forms linking, say, sponges with jellyfish, brachiopods with clams, snails with trilobites, or any other possible linkages. Because of the vital importance of these facts, extensive documentation will be provided. The following references describe the many recent publications that discuss the pervasive, perplexing, and persistent problem for evolutionary theory due to the explosive appearance of a vast array of complex invertebrates in the fossil record with a total absence of ancestors and no trace of transitional forms between the various kinds of invertebrates. Richard Dawkins, the British biologist and evolutionist, states:

The Cambrian strata of rocks, vintage about 600 million years, are the oldest in which we find most of the major invertebrate groups. And we find many of them already in an advanced state of evolution, the very first time they appear. It is as though they were just planted there, without any evolutionary history. Needless to say, this appearance of sudden planting has delighted creationists.¹⁹

Yes, indeed! The sudden appearance of these creatures fully formed does delight creationists. It is precisely what is predicted based on creation. Douglas Futuyma, ardent anti-creationist, in his book on evolutionary biology, states:

It is considered likely that all the animal phyla became distinct before or during the Cambrian, for they all appear fully formed, without intermediates connecting one form to another.²⁰

¹⁹ Richard Dawkins, *The Blind Watchmaker* (New York: W. W. Norton, 1987), p. 229.

²⁰ Douglas Futuyma, *Evolutionary Biology*, 2nd ed. (Sunderland, Massachusetts: Sinauer Associates, Inc., 1986), p. 325.

Thus, Futuyma must confess that *all* the animal phyla (a phylum is the broadest category or taxon of plants and animals; for example, all vertebrates—fish, amphibia, reptiles, birds and mammals, including man—are placed in the phylum Chordata), or at least all the invertebrate phyla, have appeared in the fossil record with absolutely no evidence that they arose from preceding forms.

James W. Valentine, geologist-paleontologist at the University of California, Santa Barbara, describes the problem this way:

Most authorities do agree that metazoan phyla more complex than flatworms have all (or perhaps nearly all) descended at least indirectly from flatworm-like stocks, since they all share many features. However, there is no agreement on the actual pathways of descent; nearly every remotely possible ancestral-descendant combination has been suggested by one or another worker. Again, the nature of forms intermediate between known groups will obviously have been different for one ancestor-descendant pair than for another.

The fossil record is of little use in providing direct evidence of the pathways of descent of the phyla or of invertebrate classes. Each phylum with a fossil record had already evolved its characteristic body plan when it first appeared, so far as we can tell from the fossil remains, and no phylum is connected to any other via intermediate fossil types. Indeed, none of the invertebrate classes can be connected with another class by series of intermediates. The relationships among phyla and classes must be inferred on the basis of their resemblance. However, even the most sophisticated techniques of phylogeny analysis have thus far failed to resolve the great differences of opinion concerning the relationships among phyla (or among many classes as well).²¹

The many invertebrate phyla such as clams, snails, brachiopods, sea urchins, sponges, jellyfish, trilobites, etc., differ drastically from one another, yet evolutionists believe, as Valentine describes, that all of them have evolved from the same common ancestor—a flatworm-like creature! This is based purely on faith, of course, for as Valentine describes later in the same article, those creatures that developed skeletonized structures (those creatures with hard parts, such as clams, snails, trilobites, corals, etc.) did so independently and without leaving any traces of ancestors or transitional forms. He says:

Each of the phyla that developed durably skeletonized lineages during this period did so independently, suggesting that the opportunities for epifaunal life were open to a wide array of adaptive types. Furthermore, many of the durably skeletonized phyla appearing in Cambrian rocks are represented by a number of distinctive subgroups, classes, or orders, that appear suddenly without known intermediates.²²

Taking into account the number of phyla, and the number of classes within each phylum that appear in Cambrian rocks, Valentine estimates that about 300 creatures with

²¹ J. W. Valentine, "The Evolution of Complex Animals," in *What Darwin Began*, ed. Laurie Godfrey (Boston: Allyn and Bacon, 1985), p. 263.

²² *Ibid.*, p. 267.

different major body plans and subplans are found in these rocks. Billions times billions of fossils of these creatures are entombed in the Cambrian rocks scattered on the face of the earth. These rocks, and the Precambrian rocks, should contain many billions of fossils of the vast number of intermediates that would have existed if evolution is true, yet not one has ever been found!

As more and more discoveries are made, evolutionists are getting squeezed increasingly. They used to date the beginning of the Cambrian period at about 600 million years, and assumed that its duration was about 80 million years. Now they are assigning a date of about 530 million years, and possibly as recently as 520 million years, for its beginning, and are being forced to squeeze the origin of the vast array of complex invertebrates into a time span which they believe may encompass no more than ten million years and most likely only five million years. Five million years is just a blink of time on their evolutionary time scale. After all, they believe that single-celled organisms existed on the earth for three billion years before these Cambrian animals emerged from nowhere.

One of the most thorough discussions of all aspects of the “Cambrian explosion” and its attendant “mysteries” is found in Chapter 1, “Origin and Early Radiation of the Metazoa,” authored by paleontologists Philip Signor and Jere Lipps in the book edited by the same authors.²³ They begin their account with the statement:

The complex of historical events encompassing the origin and early evolution of Metazoa is at once the salient feature and the most unresolved bio-historical phenomenon in the history of life. It has been the single most perplexing issue since paleontology emerged as a scientific discipline in the eighteenth and nineteenth centuries.

They report that:

The sudden appearance of diverse metazoan skeletal fossils heralds the beginning of the Phanerozoic [the Phanerozoic Age includes all of the fossil record from the Cambrian to the present] . . . there is little evidence that the capacity to form skeletons was acquired gradually or over a prolonged period. . . . A wide variety of skeleton types and most of the major marine invertebrate clades appear suddenly in the fossil record. . . . The ecological diversification of animals is equally dramatic. A wide variety of habitats were occupied by these biotas, from shallow to deep benthos and to the pelagic realm (pp. 7, 8).

Stefan Bengtson, a Swedish paleontologist, describes the situation in the following way:

If any event in life’s history resembles man’s creation myths, it is this sudden diversification of marine life when multicellular organisms took over as the dominant actors in ecology and evolution. Baffling (and embarrassing) to Darwin, this event still dazzles us and stands as a major biological revolution on a par with the invention of self-replication and the

²³ J. H. Lipps and P. W. Signor, eds., *Origin and Early Evolution of the Metazoa* (New York: Plenum Press, 1992), pp. 3-23.