

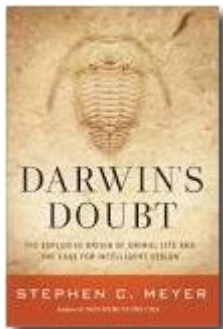
Darwin's Doubt

Dr. Ray Bohlin reviews Stephen Meyer's book Darwin's Doubt, showing that the sudden appearance of complex animal forms in the Cambrian cannot be explained by evolutionary mechanisms.

The Essence of the Cambrian Explosion



The fossil record of the Cambrian Period has been known as a problem for evolutionary theory since Darwin's *Origin of Species* in 1859. Darwin was aware of the sudden appearance of complex animal forms in the Cambrian from his own collecting in northeastern Wales. Complex animal forms such as trilobites seemed to appear with geological suddenness with no apparent ancestors in older rocks below them.



In his 2013 book, *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design*^[1], Stephen Meyer quotes Darwin from the *Origin of Species*: "To the question of why we do not find rich fossiliferous [fossil-bearing] deposits belonging to these assumed earliest periods prior to the Cambrian system, I can give no satisfactory answer. . . . The case at present must remain inexplicable; and may truly be urged as a valid argument against the views here entertained."^[2]

Meyer provides some of the historical context of this period and Darwin's disagreement with the eminent paleontologist of his day, Louis Agassiz of Harvard. Darwin's solution to his dilemma was to suggest that the fossil record is incomplete and that he fully expected that abundant fossils would be found to indicate the evolutionary origin of these Cambrian

animals. However, in the intervening century and a half, the problem has not been resolved. If anything, as we have gained more knowledge of animal life and development and found numerous deposits of periods just prior to the Cambrian, the problem is worse than Darwin perceived.

Early in the 20th century, a rich Cambrian deposit was found in the Canadian Rockies, the Burgess Shale. Entirely new organisms were found exquisitely preserved, many with soft-body parts well preserved. Then in the mid-1980s, an even earlier Cambrian deposit was found in Chengjiang, China. This deposit revealed an even richer diversity of organisms than the Burgess Shale, and even finer soft-body preservation—even down to eyes, intestines, sensory organs and stomach contents.

Later work in different parts of the world had timed the Cambrian explosion to a roughly 5-10 million year time frame around 530 million years ago [with the Cambrian period itself beginning 543 million years ago] in the evolutionary time frame. Though that's a very long time, even for evolution, it's practically instantaneous when discussing the origin of entirely new body plans. As Meyer faithfully recounts, Darwin's dream of an ever-increasing rise in complexity and diversity is shattered by the geologically abrupt appearance of both complexity and diversity.

What has been referred to as "Darwin's doubt" could be more aptly referred to as "Darwin's headache." In this article I will explore some of the additional problems this sudden explosion of animal body plans poses for evolution. While committed evolutionary materialists pretend to not be disturbed by these developments, those with open minds are questioning this long-held theory and giving new consideration to Intelligent Design.

Evolutionary Explanations of the Cambrian

Explosion

Even Darwin recognized the Cambrian as a puzzle for his theory. Darwin hoped that further exploration of fossil-bearing strata would reveal the ancestors of the Cambrian animals.

In the early 20th century, Harvard paleontologist, Charles Walcott, found a new Cambrian deposit in the Canadian Rockies, the Burgess Shale. The Burgess Shale contained new creatures never seen before and was able to preserve some soft-body parts, also never seen before. This proposed an even greater problem than Darwin knew. Older deposits were still not revealing the ancestors of the Cambrian, but now there was even more diversity and novelty than anyone had imagined. The discovery of a predator, the up-to-meter-long *Anomalocaris*, demonstrated there was a well-defined ecosystem with plant producers, plant consumers and carnivores.

The origin of the Cambrian fauna seemed to turn Darwin's theory on its head. Darwin expected all animal life forms to be descended from a single common ancestor through a lengthy process of descent with ever-so-slight modification. But these Cambrian novelties appeared quite suddenly with no ancestors. That is not evolution as Darwin envisioned it. Walcott suggested two reasons for the disparity. First, he suggested that the immediate Pre-Cambrian deposits containing the Cambrian ancestors were to be found on the ocean floor. Subsequent off-shore drilling for oil provided a unique opportunity to test this hypothesis. But most of the sea floor is much younger than the Cambrian. If there were Pre-Cambrian deposits, they no longer exist.

Walcott also tended to be a "lumper" in taxonomic terms. That means he fit fossils into already existing categories whether they fit well or not. This appeared to minimize the explosive part of the Cambrian. But additional field excavations in the Burgess Shale, as well as in different parts of the world,

revealed that many of these Cambrian creatures were unique and that their descendants are not known today—they are extinct. The novelty of Cambrian forms is more pronounced than ever.

The late Stephen J. Gould of Harvard famously described the uniqueness of these Cambrian creatures when he said; “Imagine an organism built of a hundred basic features, with twenty possible forms per feature. The grab bag contains a hundred compartments, with twenty different tokens in each. To make a new Burgess creature, the Great Token-Stringer takes one token at random from each compartment and strings them together. Voila, the creature works—and you have nearly as many successful experiments as a musical scale can build catchy tunes.”[\[3\]](#)

Fossils have been found in sediments older or below the Cambrian but these fossils do not appear to be ancestors of the Cambrian creatures. They were also quite unique and most are now extinct. The mystery remains.

Libraries of New Genetic Information Needed: Pronto!

All Darwin had to examine were the unique animals found in Cambrian deposits. He knew nothing of genetics and the need for new genetic information.

Paleontologist James Valentine has gone so far as to say that probably all the living animal phyla had their beginning in the Cambrian period, over 500 million years ago. We do find multi-celled animal fossils 20-30 million years before the Cambrian, but only sponges seem to resemble anything we find in these deposits.

A phylum is an upper level of classification. For instance, all vertebrates are in the same phylum. Insects, crustaceans, and spiders are also in the same phylum. The phylum represents organisms with a distinct body plan though there may be many

variations on that theme. In order to have all these new body plans or phyla appear in the Cambrian in a geological instant, you need a lot of new genes or genetic information. Different types of cells are needed. New genes are needed to grow new body plans out of a single-celled fertilized egg. With different cell types come different kinds of functions and cell types each needing specific gene products to give them their unique functions.

When protein sequence and gene sequence comparisons were begun in the late 70s, there was an expectation that comparing gene sequences would solve relational puzzles among living organisms but that by comparing genes from different phyla, it could be determined how phyla were related. The Cambrian fossils offer no such clues since most animal phyla appear at nearly the same time. But several decades of gene sequence comparison studies have revealed no consistent evolutionary scheme. As Meyer summarizes, "Many other studies have thrown their own widely varying numbers into the ring, placing the common ancestor of animals anywhere between 100 million years and 1.5 billion years before the Cambrian explosion." [\[4\]](#)

Meyer does a great job of articulating why there would need to be an information explosion along with the Cambrian explosion. Accounting for all this new information, in a relatively short period of time, by known processes is a herculean task. If evolution solely depends on a Darwinian model, then mutation and natural selection must be able to account for the explosive rise of new genes and regulatory gene networks during the Cambrian. Meyer spends several chapters working this through. Achieving the extreme specificity of proteins through the slow, plodding, processes of mutation and natural selection appears impossible.

In the next section I address an even greater difficulty of the Cambrian explosion. Darwinism has always needed a slow gradual accumulation of genetic change. However, with the relatively quick appearance of very different forms of animals

in the Cambrian, is Darwinism up to the task?

The Exasperating Problem of New Body Plans

Darwin understood nothing about how animal body plans are laid out and built in the early embryo.

Since Darwin's time we have learned a great deal. And none of what we have learned offers any help in deciphering how all these new body plans originated in such a short geological time period in the early Cambrian. The overall structure and shape of an organism is laid out early in embryonic development. Particular genes necessary for development are tightly controlled in when and how they are expressed. These genetic regulatory programs operate only in early development and they limit the possibilities of the final form of the organism.

Biologists use a classification term, phylum, to refer to the largest category of animals and plants. Humans belong to the Phylum Chordata, which includes all the vertebrates. Insects are in the Phylum Arthropoda, which includes crustaceans and spiders. These two phyla possess very different body plans, and the genetic programs to build these plans are very different in the earliest stages, even in the first few divisions of the fertilized egg. The Cambrian demonstrates that these very different body plans arise in less than ten million years of time geologically. Is that possible? All Darwinism has to work with as the source of genetic variation, are mutations.

In 1977, French evolutionist Pierre Paul Grassé noted that mutations don't provide any real evolutionary change. Mutations only seem to provide only a slightly different variety of what already existed.^{5} Twenty years later, a trio of developmental biologists noted that modern evolutionary theory explained well how the already fit survive and

reproduce. But just how organisms came to be that way, the modern theory seemed silent.[\[6\]](#) Evolutionary biologist Wallace Arthur explained that modern textbooks told the same stories about how finch beaks and the color of moths changed to suit their environment, but nowhere was it discussed how the organism as a whole came to be so integrally functional.[\[7\]](#)

These problems have been further addressed in recent years but nothing seems to propose any clear answers as to how new body plans could have appeared in such a short span of evolutionary time.

Steve Meyer summarizes his review of these difficulties in the light of the Cambrian saying, “The Cambrian explosion itself illustrates a profound engineering problem the fossil data does not address—the problem of building a new form of animal life by gradually transforming one tightly integrated system of genetic components and their products into another.”[\[8\]](#)

An Opportunity for Intelligent Design

I have documented how the sudden appearance of new forms in the Cambrian creates mysteries in terms of the fossils, genetics and developmental biology.

In chapter 18, Meyer turns his attention from the observation that modern evolutionary theories do not explain the sudden appearance of all the major animal groups in a short burst of geologic time, to what can explain the Cambrian Explosion. He carefully argues that Intelligent Design has all the causal power to bring about what is needed in the Cambrian.

Initially he summarizes the conclusions of two important evolutionary students of the Cambrian, Douglas Erwin and Eric Davidson. Together these scientists have listed a few of the observations any evolutionary cause must explain. First, whatever the cause of the Cambrian Explosion, it must be able to generate what is referred to as a top-down pattern. That

is, the broad general categories of animals appear before there is any refinement in these characters. Second, the cause must be capable of generating new biological forms relatively rapidly. Third, this cause must be capable of constructing, not just modifying, complex genetic regulatory circuits.

They also note, as Meyer reports, that no existing theory of evolutionary change can accomplish any of these necessary events.^{9} Davidson and Erwin are quite insistent that the processes operating in the early Cambrian were fundamentally different from anything operating in nature today. That's a tall order. But Meyer adds a few more prerequisites for a cause for the Cambrian Explosion. In addition to the need for rapid development of a top-down pattern, new body forms and creation of new genetic regulatory circuits, Meyer observes that this cause also needs to generate new digital information in the DNA and new structural information that cells use routinely. There also needs to be the development of new types of information that are precisely coordinated to specify brand new body plans.^{10}

A designing intelligence may be the only sufficient cause that can accomplish all of these events within any time frame, let alone the 5-10 million years of the Cambrian Explosion. Meyer concludes the chapter by writing, "The features of the Cambrian event point decisively in another direction—not to some as-yet-undiscovered materialistic process that merely mimics the powers of a designing mind, but instead to an actual intelligent cause."^{11}

Clearly when all the evidence is reviewed as Meyer does, the conclusion of Intelligent Design is nearly impossible to avoid. To ask how a designing intelligence did all this is to insist on a materialistic explanation for an immaterial cause. More is yet to be discovered, but if the pattern holds, Intelligent Design will become even more robust in the future.

Notes

1. Stephen C. Meyer, *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design* (New York: HarperCollins, 2013).
2. Charles Darwin, *The Origin of Species*, Chapter X (pp. 235, 252-254), quoted in *Darwin's Doubt*.
3. Stephen J. Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (New York: W.W. Norton & Co., 1989), p. 217.
4. *Darwin's Doubt*, pp. 105-106.
5. Pierre-Paul Grassé, *Evolution of Living Organisms* (New York: Academic Press, 1977), p. 87.
6. S. Gilbert, J. Optiz, and R. Raff, "Review—Resynthesizing Evolutionary and Developmental Biology," *Developmental Biology* 173 (1996): 361. "The Modern Synthesis (Neo-Darwinism) is a remarkable achievement. However, starting in the 1970's, many biologists began questioning its adequacy in explaining evolution . . . Microevolution looks at adaptations that concern only the survival of the fittest, not the arrival of the fittest."
7. Wallace Arthur, *Biased Embryos and Evolution*, (Cambridge: Cambridge University Press, 2004), p. 36. "Textbooks of evolutionary biology have for years trotted out the usual old stories about how birds' beaks evolve to match their food items, or how moths' colours evolve to match their background. But where are the equally detailed studies about the importance of one body part matching another."
8. *Darwin's Doubt*.
9. *Ibid.*, p. 355.
10. *Ibid.*, p. 358.
11. *Ibid.*, p. 381.

Was Darwin Wrong? A Rebuttal to the November 2004 National Geographic Cover Story

Our authors examine arguments for evolution commonly brought out by evolutionists. They show these arguments are not as strong as they purport and in many instances make a stronger case for intelligent design. Every person, especially Christians, should be aware of the information presented in this article.

Over the last few decades more and more scientists from every field of discipline have voiced concerns with Darwinian evolution's ability to explain the origin and diversity of life on earth. However, you would not know that from reading a recent article in *National Geographic*. The cover of the November 2004 issue grabs the reader's attention with the question, "Was Darwin wrong?" To few people's surprise, upon turning to the first page of the article you see the boldfaced words, "NO. The evidence for Evolution is overwhelming." But how can this be when so many scientists are in disagreement? Is it possible that the five lines of evidence presented in the article aren't as indisputable as the reader is led to believe? What if each one of these evidences for evolution is fatally flawed? What would evolution have left to stand upon? It is my opinion, as well as many others', that this is indeed the case. Let us critically evaluate each of these five lines of evidence (embryology, biogeography, morphology, paleontology, and bacterial resistance to antibiotics) and see

what, if anything, we can conclude from them.

Embryology

First let's examine the so-called evidence from embryology, which Darwin himself considered to be "by far the strongest single class of facts in favor of" his theory.^{1} *National Geographic* asks the question, "Why does the embryo of a mammal pass through stages resembling stages of the embryo of a reptile?"^{2} This, however, is a loaded question.

This line of evidence presented by *National Geographic* is known as Embryonic Recapitulation, or in other words, as the embryo develops it passes through stages that retrace its evolutionary past. This idea was originally developed in the mid 1800's by Ernst Haeckel, which he illustrated with drawings of embryos of various species. However, as Jonathan Wells points out in his book *Icons of Evolution*, this has been known to be false for over 100 years! Not only were Haeckel's drawings fraudulent but the late Stephen J. Gould called them "the most famous fakes in biology." Furthermore, embryologist Walter Garstang also stated in 1922 that the various stages of embryo development of different species "afford not the slightest evidence" of similarities with other species supposed to be their ancestors, stating that Haeckel's proposal is "demonstrably unsound."^{3} In 1894 Adam Sedgwick wrote, "A species is distinct and distinguishable from its allies from the very earliest stages all through the development."^{4}

So how is *National Geographic's* question, "Why does the embryo of a mammal pass through stages resembling stages of the embryo of a reptile?" a loaded question? Because mammalian embryos never pass through such stages in the first place! Darwin's "strongest" evidence for evolution turns out to be no evidence at all.

Biogeography

Biogeography, as defined by *National Geographic*, “is the study of geographical distribution of living creatures—that is, which species inhabit which parts of the planet and why.”^{5} *National Geographic* asks, “Why should [such similar] species inhabit neighboring patches of habitat?”^{6} Why are there several different species of zebras found in Africa, or dozens of species of honey creepers in Hawaii, or thirteen species of finches in the Galapagos Islands? The answer given is that “similar species occur nearby in space because they have descended from common ancestors.” There is nothing controversial about that. But I don’t believe that this in anyway supports the kind of evolution that *National Geographic* is trying to promote. Allow me to explain by taking a closer look at the term “evolution.”

There are two different kinds of “evolution” within the biological sciences. The first kind of evolution is *macroevolution*, or, big change over time. Macroevolution requires a vast amount of new genetic information and describes the kind of evolution required to make a man out of a microbe. It is this kind of evolution that is being propagated by *National Geographic*.

The second kind of evolution is *microevolution* which describes small changes or variations within a kind. For example, you may breed a pair of dogs and get another dog which is smaller than both its parents. You may then breed the new smaller dog and get an even smaller dog. However, there are limits to this kind of change.^{7} No matter how often you repeat this procedure the dog will only get so small. It is also important to note that the offspring will always be a dog. You will never get a non-dog from a dog through this kind of change. Not to mention this kind of evolution tells us nothing about where the dog came from in the first place.

So what about *National Geographic*’s examples? They are all

examples of microevolution. Why, for example, are there several species of zebras in Africa? Because they had a common ancestor that probably lived in Africa—a zebra. Or why are there thirteen species of finch on the Galapagos Islands? Because they are all descended from a single pair or group of finches. To use this kind of observation and try to explain where a zebra or finch came from in the first place goes beyond the data and the scientific method, and enters into the realm of imagination.

Evolutionists are still puzzling over the connection between these two forms of evolution, macro and micro. Perhaps the puzzle remains because macroevolution is just wishful thinking.

Morphology

Morphology is a term referring to “a branch of biology that deals with the form and structure of animals and plants.”^{8} It is presented by *National Geographic* as having been labeled by Darwin the “‘very soul of natural history.” So what is this evidence from morphology that lends itself as “proof” for microbes-to-man evolution? Simply put, it is that similarities in shape and design between different species may indicate that those species have originated from a common ancestor by way of descent with modification. *National Geographic* gives a few examples such as the “five-digit skeletal structure of the vertebrate hand,” and “the paired bones of our lower legs” which are also seen “in cats and bats and porpoises and lizards and turtles.”^{9}

Perhaps an easier to follow illustration concerning this is evolutionist Tim Berra’s famous illustration which he used in his book *Evolution and the Myth of Creationism*. In it he states the following:

If you look at a 1953 Corvette and compare it to the latest model, only the most general resemblances are evident, but if

you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. This is what paleontologists do with fossils, and the evidence is so solid and comprehensive that it cannot be denied by reasonable people [emphasis in original].[{10}](#)

So why is this illustration famous? It's because Berra, although an evolutionist, unwittingly demonstrated why similar structures across different species is just as naturally attributed to intelligent design. For what do each of these various Corvette models have in common? They were all designed and manufactured by the same company, General Motors. In fact, the Corvette has many design features in common with other automobiles as well, such as four wheels, a gasoline engine, brakes, a steering wheel, etc. Why do most cars share these things, and many others things, in common? Because they are effective and efficient features designed for the proper operation of the vehicle. Maybe this is the same reason we find commonalities between many different kinds of plants and animals.

It must be granted that if evolution were true, then one would expect to see similarities between closely related species. However, as illustrated above, they could also be explained as the result of a common designer. So how can we tell which it is?

There are at least two ways. First, if similar structures did truly descend from a common ancestor, then those structures should have similar developmental pathways. In other words, they should develop in a similar manner while still in the embryonic stage. However, as early as the late 1800's scientists observed that this simply isn't the case. Embryologist Edmund Wilson in 1894 noted that structures which appear similar between adults of different species often differ greatly either in how they form or from where they

form, or both.[{11}](#)

Secondly, if similar structures are the result of descent with modification, then you would expect the development of those structures to be governed by similar genes. Concerning this very point biologist Gavin de Beer said, "This is where the worst shock of all is encountered . . . the inheritance of homologous structures from a common ancestor . . . cannot be ascribed to identity of genes."[{12}](#) In other words, different genes govern the development of similar structures which runs contrary to what evolution would predict.

It would appear then, that morphology, the "'very' soul of natural history," is more the "ghost" of natural history than supporting evidence for evolution. There are certainly many features of organisms resulting from a common ancestry, such as the beak of the Galapagos finches; but that doesn't mean that the beaks of all birds are also related by common ancestry. Perhaps applying the perspective of Intelligent Design can help clarify the difference.

Paleontology

Paleontology simply put is the study of the fossil record. So how does the fossil record support the "theory" of evolution? According to *National Geographic*, Darwin observed that species presumed to be related tend to be found in successive rock layers.[{13}](#) *National Geographic* asks if this is just coincidental. The answer provided, of course, is a firm no. Rather, they say, it is "because they are related through evolutionary descent."[{14}](#) Is this conclusion truly supported by scientific observation?

The biggest problem with identifying a gradual change from one species into another within the fossil record is that by and large no such gradual sequence of fossils exists! With the exception of a few disputed examples, such as the horse and whale, what truly stands out in the fossil record is sudden

appearance. The late Stephen J. Gould, a world renowned evolutionist, noted concerning this, "The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology. The evolutionary trees that adorn our textbooks have data only at the tips and nodes of their branches; the rest is inference, however reasonable, not the evidence of fossils."[\[15\]](#) This is especially true within the Cambrian rock layer, dated by evolutionists at over 500 million years old, where complex species appear for the first time with no sign of gradual development from simpler forms.

To illustrate this point, imagine, if you will, that you covered the entire state of Texas with playing cards. If someone were to then go for a walk across Texas and periodically pick up a card at random, what might they begin to think if all they ever picked up were 2s and aces, and never any of the cards in between? He might begin to wonder if those other cards were there at all.

This is precisely what we find within the Cambrian rock layer. We always find fully formed species, like finding just 2s and aces, and never any intermediates, like your 3s, 4s, and so on. In fact, *National Geographic* even acknowledges this problem when it compares the fossil record in general to a film with 999 out of every 1,000 frames missing.[\[16\]](#) It's more likely that there are few if any missing frames; rather those frames never existed in the first place.

Darwin himself, observing the lack of transitional forms within the fossil record, noted this problem to be "perhaps the most obvious and serious objection which can be urged against [his theory of evolution]."[\[17\]](#) Today, with nearly 150 years of advancements in the area of paleontology, the fossil record still fails to meet the expectation of Darwin's theory. This problem goes unaddressed by *National Geographic*.

Bacterial Resistance to Antibiotics

National Geographic derives a fifth line of evidence from more recent scientific data. They state, "These new forms of knowledge overlap one another seamlessly and intersect with the older forms, strengthening the whole edifice, contributing further to the certainty that Darwin was right." {18} Is this really the case? The most lauded of these "new forms of knowledge" is from the study of bacteria that acquire resistance to modern medicines. *National Geographic* states that "there's no better or more immediate evidence supporting the Darwinian theory than this process of forced transformation among our inimical germs." {19}

These adaptations are in fact evidence for change over time, but not the kind that would change a microbe into a man. Rather, all examples of bacterial resistance are that of micro-evolution, i.e. change *within* a kind. For example, a staph infection is caused by a bacterium known as a *Staphylococcus* or "staph" for short. Whenever a staph bacterium acquires resistance to a particular antibiotic, it still remains a staph. It doesn't change into a different kind of bacterium altogether. In fact, no matter how much it changes, it always remains a staph.

Secondly, when we take a closer look at how bacteria become resistant to a particular treatment, we find something very interesting. Just like in humans, information on how bacteria grow and survive is stored in the bacteria's DNA. Therefore, if any change is to take place to turn an organism from one kind to another "more complex" kind, such as a microbe into a man, it must add new information to that organism's DNA. However, that is not what we observe taking place in bacteria at all. New information is *never* created. Existing information may be modified, lost, or even exchanged between bacteria, but never created.

Thirdly, and perhaps most significantly, is that nothing which

National Geographic presents even begins to explain where the information to make a bacterium came from in the first place. Rather, and to no surprise to the creationists, the study of bacterial resistance testifies to an intelligent Designer who created all living organisms with an ability to adapt to changing environments.

Conclusion

Modern science has indeed offered us great insight into the complexities of life and the inner workings of all living things. Advances in population genetics, biochemistry, molecular biology, and the human genome will surely result in greater understanding of life on our planet. But unlike what *National Geographic* suggests, it is these advances which have served to convince an increasing number of scientists to abandon Darwin's theory as an explanation for the origin of life on earth. Rather, these advancements point to the necessity of intelligent design as an added tool in the toolbox.

Notes

1. Jonathan Wells, *Icons of Evolution* (Washington, DC: Regnery Pub., 2000), 82.
2. David Quammen, "Was Darwin Wrong?," *National Geographic* November, 2004: 13.
3. Wells, 88.
4. Ibid., 97.
5. Quammen, "Was Darwin Wrong?," 9.
6. Ibid., 12.
7. Lester, Lane P., Raymond G. Bohlin, and V. Elving Anderson, *The Natural Limits to Biological Change* (Dallas: Probe Books : Distributed by Word Pub., 1989).
8. Merriam-Webster Inc., *Merriam-Webster's Collegiate Dictionary*, 10th ed. (Springfield, Mass: Merriam-Webster, 1996).
9. Quammen, "Was Darwin Wrong?," 13.

10. Tim Berra, *Evolution and the Myth of Creationism* (Stanford, Calif.: Stanford University Press, 1990), 117.
11. Edmund B. Wilson, "The Embryological Criterion of Homology," pp.101-124 in *Biological Lectures Delivered at the Marine Biological Laboratory of Wood's Hole in the Summer Session of 1894* (Boston: Ginn & Company, 1895), p. 107.
12. Wells, *Icons of Evolution*, 73.
13. Quammen, "Was Darwin Wrong?," 12.
14. Ibid., 13.
15. Stephen J. Gould, "Evolution's Erratic Pace," *Natural History* 85(5).
16. Quammen, "Was Darwin Wrong?," 25.
17. Charles Darwin, *On the Origin of Species by Means of Natural Selection* (New York, New York: The New American Library of World Literature, Inc., 1958), 287.
18. Quammen, "Was Darwin Wrong?," 20.
19. Ibid., 21.

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Evolution's Big Bang

Another Big Bang?

The impish Calvin, from the now defunct daily comic strip "Calvin and Hobbes," once offered to rename the Big Bang Hypothesis, "The Horrendous Space Kablooie!" Most of us have heard at some point of cosmology's preferred explanation for the origin of the universe, the Big Bang Hypothesis. The Big Bang of cosmology describes the origin of the universe as occurring in a powerful explosion that eventually results in the universe as we see it today. But a recent issue of *Time* magazine (4 December 1995) heralded a new Big Bang, a Big Bang

of biological evolution previously known as the Cambrian Explosion of Life. And just as many draw theistic conclusions from cosmology's Big Bang, so it is possible to draw theistic conclusions from what is now being called Evolution's Big Bang.

But first, just what is evolution's Big Bang? The cover of this issue of *Time* declared: "New discoveries show that life as we know it began in an amazing biological frenzy that changed the planet almost overnight." A subheading just in front of the inside article proclaimed, "For billions of years, simple creatures like plankton, bacteria, and algae ruled the earth. Then, suddenly, life got very complicated."

The standard evolutionary story describes an earth bombarded by meteorites from its origin 4.5 billion years ago until almost 3.8 billion years ago. Within only 100 million years the first life evolved following the cessation of this celestial onslaught. This, in and of itself, is a huge evolutionary hurdle without explanation. For the next 3 billion years, little else but single-celled life forms ruled the planet. Then suddenly, in the Cambrian geological period, the earth is populated with a huge diversity of complex multicellular life forms. This has always looked suspiciously like some form of creation event, and paleontologists frequently seemed rather embarrassed by the reality of the Cambrian Explosion.

So, where is the documentation for the long history of the evolution of these creatures? The usual answer is that the necessary fossil layers prior to the Cambrian period have not been discovered yet. The fossils are just missing! Hmmm. . . . how convenient! This, after all, was Darwin's excuse and many evolutionists after him followed suit. Well, recent discoveries from Canada, Greenland, China, Siberia, and Namibia document quite clearly that this period of biological creativity occurred in a geological instant virtually all around the globe. So, the usual excuse no longer holds water.

While evolutionists are not exactly joining a creationist wave of conversion, they are being forced to ask tough questions concerning the nature of evolutionary change. Darwin did not envision major evolutionary change happening this fast. Darwinism has always been characterized by slow gradual change that is imperceptible in our time frame. Major evolutionary change was only visible as we looked to the fossils to reveal the number and type of intermediates between species and major groups. But the Cambrian explosion is anything but gradual, and identifiable intermediates are totally absent. Where are the ancestors? What conditions could have prompted this frenzy of creativity? Is there some form of unknowable evolutionary mechanism at work? I think you will find the evolutionary community's answers to be quite revealing.

How Fast is Fast?

Anomalocaris! Ottoia! Wiwaxia! Hallucigenia! Opabinia! If these names are unfamiliar to you, well, they should be. For they are only becoming familiar to paleontologists over the last twenty years. Paleontologists are those scientists who study the fossils embedded in ancient layers of rock. And this strange list represents a group of animals from the Cambrian period that is only now being appreciated—animals which supposedly lived over 500 million years ago. These animals not only possess strange sounding names, but are even stranger looking! So strange and different are they that most are contained in phyla of which they are the only example and which no longer exists.

Whoa! . . . you say! And just what is a phyla? Well, if you think way back to high school biology, *phyla* is actually the plural form of *phylum*, a Latin term designating a large category of biological classification. The largest category of classification is the Kingdom. We all know about the Animal and Plant Kingdoms. Well, Phylum is the next category below Kingdom. The Animal Kingdom consists of such well known phyla

as the molluscs which contains clams, oysters, and snails. Another commonly known phylum is the annelids to which belong the earthworms. The largest of all phyla is the arthropods. Arthropods range from insects to millipedes to spiders to shrimp. We are placed in the phylum Chordata along with all other vertebrates, the fish, amphibians, reptiles, and other mammals. Representatives from different phyla are very different creatures. There is not much in common between a human, an earthworm, a clam, and a mosquito. They are all from different phyla—so different that evolutionists have assumed that it must have taken tens of millions of years for these phyla to evolve from one common ancestor.

Yet, here is the real puzzle of the Cambrian Explosion for the theory of evolution. All the known phyla, except one, along with the oddities with which I began this discussion, first appear in the Cambrian period. There are no ancestors. There are no intermediates. Fossil experts used to think that the Cambrian lasted 75 million years. But even that seemed to be a pretty short time for all this evolutionary change. Eventually the Cambrian was shortened to only 30 million years. And if that wasn't bad enough, the time frame of the real work of bringing all these different creatures into existence was limited to the first five to ten million years of the Cambrian. This is extraordinarily fast! Harvard's Stephen Jay Gould says, "Fast is now a lot faster than we thought, and that is extraordinarily interesting." What an understatement! "Extraordinarily impossible" might be a better phrase!

In the *Time* magazine article (p. 70), paleontologist Samuel Bowring says, "We now know how fast fast is. And what I like to ask my biologist friends is, How fast can evolution get before you start feeling uncomfortable?" I would love to ask Bowring just what he meant by that statement. It's almost as if he is recognizing that current evolutionary mechanisms can't possibly act that fast. The potential answers to that dilemma are only creating more questions, questions that

evolutionists may never be able to answer.

How Could the Cambrian Explosion Occur?

Charles Darwin proposed an evolutionary process that was slow and gradual. This formulation has remained the mainstay of evolutionary explanations for the over 100 years since Darwin until very recently. One of the many reasons for a rethinking of this slow, gradual, snail-like pace has been the intricate complexity of living things. In the years before Darwin, the marvelous fit of an organism to its environment was considered the chief evidence of a Supreme Designer. But Darwin supposedly showed another and better way, natural selection. But if organisms were so finely-tuned to their environment, so wonderfully adapted to their particular niche, then if they were to change at all over time, then that change would have to be very gradual so as not to upset too quickly that delicate balance between the organism and its environment.

This notion of the gradualness of the evolutionary process was deeply reinforced with the discovery of DNA and the genetic code. DNA operates as an informational code for the development of an organism from a single cell to an adult and also regulates all the chemical processes that go on in cells. Mutations, or mistakes in the code had to have very minor effects. Disruption of the blueprint would be very sensitive. The small changes brought about by mutations would have to be cumulative over very long periods of time to bring about significant evolutionary changes.

This necessity of gradualism explains the difficulty evolutionists have concerning the Cambrian explosion or Evolution's Big Bang, as *Time* magazine called it. How could animals as diverse as arthropods, molluscs, jellyfish, and even primitive vertebrates all appear within a time span of only 5-10 million years with no ancestors and no intermediates? Evolution just doesn't work this way. Fossil experts and biologists are only beginning to wrestle with this

thorny dilemma. Some think that genes which control the process of development from a fertilized egg to an adult, the so-called *Hox* genes, may have reached a critical mass which led to an explosion of complexity. Some of the simplest multi-celled organisms like the jellyfish only have three *Hox* genes, while insects have eight, and some not-quite-vertebrates have ten. Critical mass may be a real phenomena in physics, but biological processes rarely if ever work that way. Besides, that doesn't solve the important riddle of where the first *Hox* gene came from in the first place. Genetic information does not just spontaneously arise from random DNA sequences.

Other scientists think that a wholesale reorganization of all the genes must have also changed along with the duplication of *Hox* genes to bring about this stupendous amount of change. But that only complicates the picture by requiring additional, simultaneous genetic mutations that have to occur virtually all at once. This would have an enormous negative effect on an organism that was already adapted to its environment. How could it survive? It seems that the equivalent of a miracle would be required. But such things aren't allowed in evolution. To quote *Time* magazine again,

Of course, understanding what made the Cambrian explosion possible doesn't address the larger question of what made it happen so fast. Here scientists delicately slide across data-thin ice, suggesting scenarios that are based on intuition rather than solid evidence.

Why Hasn't Such Rapid Change Ever Happened Again?

Before addressing this question, let's review our discussion thus far. Evolution's Big Bang, the Cambrian explosion of life that supposedly occurred over 500 million years ago, continues to puzzle evolutionists. Recent discoveries have narrowed the time frame from over 70 million years to less than 10 million

years. This has only complicated their dilemma because so many different creatures appear in the Cambrian with no ancestors or intermediates. The major evolutionary innovations represented in the Cambrian would ordinarily require at least tens of millions of years to accomplish. Some might even suggest over 100 million years would be required. The differences between the creatures that suddenly appear in the Cambrian are enormous. In fact these differences are so large many of these animals are one of a kind. Nothing like them existed before and nothing like them has ever appeared again.

In fact, a question that is just as perplexing as how this explosion of diversity could occur so fast, is why hasn't such drastic change ever happened in the 500 million years since? The same basic body plans that arose in the Cambrian remain surprisingly constant ever since. Apparently, the most significant biological changes in the history of the earth occurred in less than ten million years, and for 500 million years afterward, this level of change never happened again. Why not? This may seem like a simple question, but it is far more complicated than it appears.

Many biologists think the answer must lie within the genetic structure of organisms. During the Cambrian, new forms of life could readily appear because the genetic organization of organisms was relatively loose. Once all these body plans came into existence and were successful, then these same genetic structures became relatively inflexible in order to preserve what worked so well. In other words there may be genetically built-in limits to change. Developmental biologist Rudolf Raff said, "There must be limits to change. After all we've had these same old body plans for half a billion years." Lane Lester and I coauthored a book over ten years ago titled *The Natural Limits to Biological Change*. Though the limits to change we proposed were tighter than what these evolution scientists are proposing, it is the same basic idea. We even suggested that these limits to change would be found in the

genetic organization and regulatory programs that are already built in.

Some evolutionists have gone so far as to suggest that the mechanisms of evolution operating in the Cambrian were probably radically different from what has taken place ever since. This raises the possibility that we may never be able to study these mechanisms because animals with the proper genetic structure no longer exist. We are left only with the products of the Cambrian explosion and none of the precursors. The speculations will therefore be wild and uncontrollable since there will be no way to test these theories. Fossils leave no trace of their genetic organization. We may never be able to know how this marvelous burst of creativity occurred. Sounds like evolutionists may be faced with the very same problems they accuse creationists of stumbling over: a process that was unique to the past, unobservable in any shape or form, and unrepeatable.

Stuart Kaufmann, a leader in complexity theory, places his faith in self-organizing systems that spontaneously give rise to order out of chaos—a sort of a naturalistic, impersonal self-creator. A supernatural Creator performs the same function with the added benefit of providing a source of intelligent design as well.

Marvelous Evidence of Creation and Design and the Role of World View

So often at Probe our focus is on some issue that has the opposing forces shaped by worldview. A worldview is a system of beliefs or philosophy of life that helps us to interpret the world around us. We often compare one's worldview to a pair of glasses that helps bring everything into focus. Just as it is important for someone with impaired vision to have the right prescription glasses, so it is also necessary for sin-impaired people to have the right world view with which to

make sense of the world of ideas around us.

Clearly we believe that the Bible offers the only tool to arrive at the right prescription or worldview. We have been discussing here Evolution's Big Bang, the Cambrian explosion of life approximately 543 million years ago according to evolutionists. The latest discoveries in this field were highlighted in *Time* magazine's 4 December 1995 issue. Three weeks later, some very interesting letters appeared from readers in *Time*. They are very instructive of the effects of one's worldview when evaluating the very same evidence. Much of our time in this pamphlet has been spent detailing the vast problems that the Cambrian explosion produces for evolutionary theory. But that is from the vantage point of a biblical worldview. One *Time* magazine reader commented, "This report should end discussions about whether God created the earth. Now there is no way to deny the theory of evolution." Another reader said, "It is great to see a national magazine put the factual evidence of evolution's vast, complex story out there for the lay public."

Now, before you go assuming that they surely didn't read the same story I have been describing in these pages, listen to these readers with a different perspective. "A more appropriate title for your article could have been 'Evolution's Big Bust.' One hundred and thirty-five years of Darwinism out the window just like that? What a poor excuse for the lack of transitional forms." Another reader said, "This story read more like confirmation for Noah's Deluge than Darwin's theory of evolution."

Well, they all read the same story. Many even quoted from the article to explain their views. So, how can four people read the same information and come to such radically different conclusions? The difference is worldview. To those who are working within a naturalistic worldview, one which holds that there is no God, some form of evolution must be true. Therefore, while the evidence of the Cambrian may be

perplexing, the fact that scientists are wrestling with it and offering some possible explanations is exciting and invigorating. However, I find that they are usually missing the big picture. By concentrating on explaining the minutiae, naturalistic thinkers often miss the clear possibility of intelligent design precisely because they don't expect to find any.

A great example of this is a comment by Harvard's Steven Jay Gould on the Cambrian creatures found in the Burgess Shale of Canada:

Imagine an organism built of a hundred basic features, with twenty possible forms per feature. The grab bag contains a hundred compartments, with twenty tokens in each. To make a new Burgess creature, the Great-Token-Stringer takes one token at random from each compartment and strings them together. Voila, the creature works—and you have nearly as many successful experiments as a musical scale can build catchy tunes.

Sounds like a marvelous description of a Creator to me, but perhaps only if you are thinking biblically from the start.

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