

How Did We Get Here?

Letter 1

Kenneth R. Miller, November 14, 1996

Dear Phillip,

I am always struck by the fact that human awareness of our place in nature, like so much of modern science, began with the industrial revolution. For much of history it was possible to believe that the great diversity of life on Earth was a fixed creation, that the living world had never changed. But when the first stirrings of industry demanded that fuel be dug from the earth and hillsides be leveled for roads and railways, the Earth's true past was dug up in abundance. In a few short decades museums filled with fossils that documented a living past dramatically different from the present-day.

This record of past life demanded explanation, and naturalists struggled to provide one. Georges Cuvier, the great naturalist of the Napoleonic era, adamantly maintained that species were fixed and unchangeable. His own studies of fossils, however, revealed a pattern of extinctions and appearances so compelling that even Cuvier had to propose a series of catastrophic extinctions and renewals in which new species appeared. Etienne Geoffroy, his contemporary, had a more direct explanation for the detailed sequences of fossil crocodiles that he studied. Geoffroy noted that as he went back in time, these fossils became less and less like those of contemporary animals. Geoffroy was not sure how it had happened, but the fossils left him with no doubt as to what had happened. Present-day crocodiles were the descendants of these ancient forms - crocodiles had evolved.

As you know, the fossil record includes not only the ancestors of crocodiles and whales, but also the ancestors of human beings. And this, of course, is why evolution remains controversial. The great achievement of Charles Darwin was that he was the first to propose a theoretical mechanism for the fact of evolution that is documented in the fossil record. The operation of that mechanism, natural selection acting over time upon the variation in species, is a demonstrable fact. However, this does not mean that we fully understand how new species are formed, that we can look to the fossil record and always say with certainty what forces were acting upon a particular species, or that we know enough to weigh the relative importance of natural variation, mutation, gene transfer, or geographic isolation in the process of evolution.

What is the current scientific status of evolutionary theory? Biology is far from understanding exactly how a single cell develops into a baby, but research suggests that human development can ultimately be explained in terms of biochemistry and molecular biology. Most scientists would make a similar statement about evolution. We cannot yet explain everything about our natural history, but we know enough to be sure that Darwin's mechanism was at the heart of it. How did we get here? We were produced by what Darwin called "descent with modification," a process of change that links us with the grand story of life on earth. In other words, like everything else on this warm and wonderful planet, we evolved.

Letter 2

Phillip E. Johnson, November 19, 1996

Dear Kenneth:

The Lennart Nilsson photographs that provide the occasion for this discussion illustrate the development of the embryo in the womb -- NOT the historical process of how we get humans or animals in the first place. These very distinct subjects are often confused. For example, Darwinists long maintained that "ontogeny recapitulates phylogeny," meaning that the human embryo evolves through a fish stage and then through amphibian and reptilian stages before it takes on its human form.

This recapitulation doctrine was discarded by science long ago, but it survives in popularizations. For example, the *Life* magazine article accompanying the Nilsson photographs admitted that science has repudiated recapitulationism -- but nonetheless argued that features like supposed "gill slits" provide a "hazy" version of evolutionary history. But human embryos never possess gills, either in embryonic or developed form, and the embryonic parts that suggest gills to the Darwinian imagination develop into something entirely different.

The recapitulation thesis is false, and viewers of the Nilsson photographs should be warned against any insinuations that the photos illustrate a replay of evolutionary history. Agreed?

A related misunderstanding says that animals are much alike as early embryos, and become dissimilar later in embryonic development. Darwinian theory reasons that early embryonic similarities reflect common ancestry, with evolutionary differences emerging later in development. The Nilsson series appears to support this theory with photos of vertebrate embryos in mid-development that look similar in shape -- but this overlooks the crucial fact that the embryos develop to that stage by very different means.

The early stages of vertebrate development are actually radically dissimilar. If early developmental similarity is the test of common ancestry, then vertebrates do not share a common ancestor.

So the Nilsson photos do not provide evidence of common ancestry, and they certainly do not illustrate the Darwinian process of mutation and selection. What these misunderstandings actually illustrate is how overly enthusiastic Darwinists have sometimes misled themselves. I note that you do not rely either on echoes of recapitulationism or on early embryonic similarities to prove common ancestry, and so perhaps you agree with me so far.

Now to the evidence you do cite. The mutation/selection mechanism has never produced anything more impressive than variations in pre-existing populations (microevolution). The claim that natural selection can create new complex organs has been challenged by the evidence of irreducible complexity at the molecular level. (Should we discuss *Darwin's Black Box*, by Michael Behe?) The fossil record also remains on the whole pervasively anti-Darwinian, even though the paleontologists have tried as hard as the embryologists to impose a Darwinian

interpretation. Where are the common ancestors of the animal phyla? Where is the testable mechanism for macroevolution?

Did we evolve? Maybe, but very little is known about the mechanism and much misinformation has been spread in an effort to prove, in the words of your textbook, that "evolution is random and undirected." How do you know that?

Letter 3

Kenneth R. Miller, November 23, 1996

Dear Phillip,

I agree it would be great fun to debate your book, Behe's book, or my books, but if we can, I'd like to keep discussion here focused on evolution itself.

As you note, the splendid Nilsson photographs show striking similarities in embryonic development between humans and other vertebrates. However, I was surprised to see you knock down Ernst Haeckel's "Ontogeny recapitulates Phylogeny" argument as a straw man for evolution. Haeckel was wrong, as the Life magazine article carefully points out. But it is an even greater mistake to maintain that development teaches us nothing about evolution.

The development of any animal is controlled by the unfolding of an internal genetic program. Haeckel believed that changes could only be added at the end of that program, the source of his well-understood mistake. Mutations that affect structure or timing can in fact occur at any part of the program, including the beginning. Because of this, there is no reason to be surprised at the fact that adaptations to the vastly different sizes of mammalian and avian eggs have produced "radically dissimilar" patterns of cell division in the early embryo. The chicken embryo develops on top of a huge store of nutritional yolk, which it gradually surrounds with an egg sac. The human embryo has no such store, and must implant in the uterine wall to obtain nourishment. Once both embryos surmount these early challenges, the rest of their development is remarkably similar, and that's precisely the point.

There is a marvelous consistency to the evidence for evolution. Mammals possess a developmental pattern clearly modified from earlier forms, their fossil history abundantly documents their evolution from a group of reptiles more than 100 million years ago, and DNA sequence comparisons show the very same relationships suggested by the fossil and developmental evidence. I challenge you to present an alternative explanation consistent with this interlocking set of facts from so many completely different sources.

Curiously, you claim the fossil record is "pervasively anti-Darwinian," and demand "common ancestors of the animal phyla." Demanding specific ancestral forms from the oldest and rarest fossil formations is good strategy, but poor science. In fact, if evolution were incorrect, I should not be able to name any ancestors for modern animals. But, as you know, had you asked for the ancestors of horses, elephants, or whales the fossil record provides them in expanding abundance. Isn't this exactly the evidence you claim is lacking? I'm not sure what you mean by "anti-Darwinian," but the fossil record certainly isn't anti-evolution!

Finally, I'd like to ask you a specific question on human origins. The New York Times this week (11/19/96) reported an important hominid fossil that helps to complete the picture of human evolution. If you reject evolution, how do you interpret this and the scores of other hominid fossil finds? The facts of fossil morphology persuasively argue that these organisms were indeed human ancestors. I look forward to your response.

With Best Wishes,
Ken

Letter 4

Phillip E. Johnson, November 26, 1996

Dear Kenneth:

The message of Sunday's first installment of the Nilsson series was pure recapitulationism: "The journey of each of us reflects the journey of our species," and "This is the Odyssey of Life as it reflects the course of evolution in days instead of millennia." The program conveyed the impression that embryos start out the same and evolve differences later in development, with no hint that the early stages of vertebrate development are actually radically dissimilar. Haeckel's Law may be dead in science, but its appeal to the Darwinian imagination keeps it alive.

The program also gave Darwin's mechanism of mutation and selection an unqualified endorsement, as the supposed builder of a genetic program directing development. This is the primary point in controversy, because (whether or not all organisms share a common ancestor) the most important claim of "evolution" is that you don't need a mind to produce the vast complexity of organisms.

This "blind watchmaker" thesis is continually presented as fact, but it could better be called materialist mythology. The mechanism is observed only at the micro level, and it certainly hasn't been shown capable of producing the kind of alterations in embryonic development which macroevolution would require. Furthermore, the fossil record pervasively fails to reflect the gradual progressive changes that would be expected if evolution worked through the accumulation of micromutations.

The program cites cilia (hair-like propellers) as a triumph of evolution, but microbiologist Michael Behe has shown that cilia are irreducibly complex mechanisms. Behe reports that there are no plausible Darwinian scenarios for the gradual evolution of cilia or other complex molecular systems. We don't often hear about the troubles with natural selection in Nova specials! Why not?

Difficulties with the mechanism are swept aside because "evolution" aspires to be both a branch of experimental science and a naturalistic religion. The religious objective predominated Sunday night. The message was "believe that evolution is your true creator, and you will find your proper place in nature." To that end all the propaganda stops were pulled out, including the dog that became a dolphin. (Try detailing the functional intermediate steps.) Embryology, which is full of phenomena that disappoint Darwinian expectations, was repackaged as "ontogeny sort of recapitulates phylogeny, if you look at the evidence selectively and through Darwinian lenses."

The heart of the Darwinian religion is the claim, advanced in all the textbooks, that evolution is an undirected and purposeless process that produced humans by accident. Because the Darwinists are so determined to have us believe that, they tend to slide over facts that might raise doubts.

I'll address your fossil points in my next message (the program and the mechanism had to come first). Will you answer this: Why do the textbooks (including yours) insist that evolution is undirected and purposeless? Is that a finding of science, or a philosophical assumption?

Best regards,
Phillip

Letter 5
Kenneth R. Miller, November 30, 1996

Dear Phillip,

I noted earlier that evolution consistently explains the interlocking evidence from paleontology, development, and DNA, and challenged you to present an alternative. You have not. Rather than present an alternative (and fail the tests evolution passes), I suspect you'd prefer just to raise objections, hoping to establish reasonable doubt. Good lawyering, weak science.

You made a serious mistake when you called the dog-to-dolphin sequence "propaganda," asking me to "try detailing the functional intermediate steps." A perfect example of criticism unrestrained by fact. I don't have to "try" to detail the intermediates ... they existed. Beginning with a mesonychid mammal (your "dog") the intermediates are *Pakicetus*, *Ambulocetus*, and *Rodocetus*, leading to a true whale, *Basilosaurus*. Even *Basilosaurus* itself is intermediate. It had hindlimbs, a nose in front, and teeth like those of its carnivore ancestors, not modern cetaceans.

Once again, the fossils support evolution. Beaten on this score, you withdraw to attack the mechanism.

You wrote: "The mechanism is observed only at the micro level, and it certainly hasn't been shown capable of producing the kind of alterations in embryonic development which macroevolution would require." I note that you do agree that the mechanism of evolution - natural selection acting on variation - is observable fact. Thanks. Score one for evolution. However, you restrict that mechanism to the "micro level." Unfortunately for this argument, you are not correct.

First, many fossil sequences fit the "micro" pattern perfectly, including the evolution of mammals from reptiles. These alone disprove your contention. Second, a number of well-understood mechanisms, including single gene mutations, produce changes that qualify as macroevolution. These include heterochronic mutations that alter structures by changing growth rates, homeotic mutations that change the identities of whole body parts, and paedomorphosis, which converts juvenile stages directly to adult ones. Indeed, the most recent issue of *Science* (Nov-15, page 1082) reported that a single gene controls tunicate tail formation. Mutate it, the tail is lost. Restore it, tail comes back. Just another example of a genetic mechanism producing macroevolutionary change. Score two for evolution.

Phillip, could it be that your real concerns are philosophical, not scientific? You charge that one of my textbooks says "evolution is undirected and purposeless." Joe Levine and I actually wrote that "natural selection operates in a manner similar to artificial selection, but ... without any goal or purpose." We meant, of course, to contrast the forces of nature with the direct and conscious selection of the breeder. But science cannot determine "purpose," so (point taken) this poor choice of words will change at next printing.

Not even Michael Behe, who claims to have discovered "irreducible complexity" in biochemistry, disputes the common descent of vertebrates or the validity of the fossil record in

depicting that descent. To date your only substantive criticisms are stabs at the old notion of ontogeny recapitulating phylogeny, a notion that author Scott Gilbert accurately notes "was not Darwinism." I enjoy answering these queries, but do wonder if you actually have a theory to put forward.

Best Wishes,
Ken

Letter 6
Phillip E. Johnson, December 3, 1996

Dear Kenneth:

The NOVA show implicitly endorsed recapitulationism, as did Charles Darwin. Haeckel's Law is no strawman, but a widespread illusion that continues to mislead people. Now to the fossils:

Niles Eldredge has written: "No wonder paleontologists shied away from evolution for so long. It never seems to happen." New things appear suddenly in rocks dated in different ages, but there is no pattern of gradual transformation and no ability to identify specific ancestors of major groups. Although Eldredge admits that the fossil record contradicts the theory of gradual adaptive change, he nonetheless calls himself a "knee-jerk neo-Darwinist," meaning apparently that he believes the theory despite what he knows as a paleontologist.

The non-occurrence of Darwinian change is particularly evident where fossils are most plentiful - in marine invertebrates, for example. There it's all variation within the type, with no substantial evolution. Thus Eldredge, a trilobite specialist, tells stories about hominids when he wants to lecture about evolution.

The occasional claims of fossil transitional forms nearly all involve vertebrates, and become "ancestors" only through subjective interpretation. Hominid stories are particularly plentiful because ape and human bones are sufficiently similar that, with a bit of imagination, a variant ape can be seen as on the way to becoming human.

Considering the overall pattern, the claimed transitionals may just be artifacts of the theory. It's commonplace that researchers in any field will find examples to confirm what they already believe, especially where the evidence is scanty and open to interpretation. If you want to test the theory instead of just support it, you have to look at the evidence as a whole without assuming that the theory is true. When we do this, we find that the fossil record remains as it was in 1859: pervasively anti-Darwinian despite unremitting efforts to impose a Darwinian interpretation. (Chapter 4 of *Darwin on Trial* provides details.)

Now let's suppose for argument's sake that *Australopithecus* did become *Homo*, and that wolf-like *Mesonyx* somehow became *Ambulocetus*. Was this by an accumulation of micromutations through natural selection? How did the "dog" improve in fitness while its body was in the early stages of this transformation to aquatic life? What mechanism known to science can produce human mental capacities from an ape brain? What is the source of the vast amount of information required to create these wonders?

The mechanism is all-important because that is what gets the Creator out of the picture. In fact, the mechanism finds its primary support in materialist philosophy, not evidence. If materialism is true, then something roughly like Darwinism is a logical necessity regardless of the evidence. That is why so many believe so fervently despite the fossil disappointments. They were taught that materialist philosophy and science are basically the same thing, and that the most plausible materialist speculation constitutes "scientific knowledge."

I'm not proposing another theory; I'm explaining why I'm not convinced by yours. When the truth is that we don't know, it's best to say so.

Best,
Phillip

Letter 7
Kenneth R. Miller, December 6, 1996

Dear Phillip,

In your last installment you revealed the real reasons for our disagreements, and I hope every reader noticed. You clearly stated what I have suspected all along. Your objections to evolution aren't scientific. They are religious.

You wrote that a successful mechanism for evolution would "get the Creator out of the picture," and that is why the mountain of scientific evidence on my side of this debate is irrelevant to you. Phillip, as a religious person myself, I would love to have a thousand words to explain why one does not have to reject evolution to believe in God, but that would shift our debate into theology. However, I am truly grateful you revealed the real source of your objections to evolution.

Now back to science. You have, of course, used Eldredge out of context. He was arguing in favor of one pattern of evolutionary change against another, and you made it seem as though he was arguing against evolution per se. He was not. A clever trick, but not good science. You continue this sad pattern when you argue that hominid (human-like) fossils may be just "variant apes." Can you possibly be serious about this? We have a rich and growing fossil record of human ancestors, detailed last month in the Times article that you (wisely) did not dispute. No person skilled in primate anatomy would fail to recognize the fact that these are distinct species that predate us and include our ancestors.

Remember when you challenged me for "intermediate steps" in the evolution of whales? Well, I produced them. But now you say that didn't matter unless I can explain the mechanism of that change. OK. The mechanism was natural selection, acting on developmental mutations and variation, adapting these land-dwellers to new opportunities - shallow tidal inlets loaded with fish. As I explained last time, there are a whole series of well-understand mutational mechanisms that can produce the changes in body structure this would require. So a plausible mechanism is no mystery, no matter how hard you try to pretend that it is.

Finally, Phillip, your mention of "materialist philosophy" entirely misses the point of how science works. You imply that if we do not understand the exact mechanism of a process (like evolution) we must allow for intervention by the "Creator." Sorry, but science doesn't work that way. Consider what happens when a living cell divides and its chromosomes move apart. We do not, in fact, know exactly what produces the force that moves chromosomes. Do I make a "materialist" assumption when I say that the force is probably generated by biochemical mechanisms? Of course not. But your logic would claim there is no mechanism, and the Creator Himself has to push every chromosome around. C'mon.

Phillip, I truly believe that God gave us our abilities to learn as much as we could about nature. And that one of our greatest discoveries is the very one you seek to deny - the process of evolution.

Best Wishes,
Ken

Letter 8
Phillip E. Johnson, December 9, 1996

Dear Kenneth:

In 1995 the National Association of Biology Teachers (NABT) passed a resolution that tells us what is implied by the slogan "evolution is a fact:"

"The diversity of life on earth is the outcome of evolution: an unsupervised, impersonal, unpredictable, and natural process of temporal descent with genetic modification that is affected by natural selection, chance, historical contingencies, and changing environments."

This statement is contrary to the evidence in many respects:

1. Mutation can't create the immense amounts of useful information required for creative evolution. Even the exceptional mutations that have beneficial effects (like the human sickle-cell gene) do not involve the creation of new organs or capabilities. The developmental mutations on which you rely are no exception. Most are harmful, and the few that are not only explain the loss of a structure, or its replacement by a pre-existing one in the same organism, never the emergence of a new complex organ. Adding natural selection to the mechanism doesn't help, because selective death only preserves what mutation has already created.
2. The fossil record, despite decades of effort by paleontologists determined to find transitional sequences, is still overwhelming characterized by the absence of gradual macroevolutionary transformations. Darwinists have to avoid or downplay this evidence, and they do. For example, the high school textbooks ignore the Cambrian explosion, and never inform students about the problems posed for the Darwinian theory by this sudden appearance of the animal phyla. Instead they tell hominid stories, thus relying on the evidence most amenable to subjective evaluation.
3. The latest evidence from molecular biology confirms that the living world is full of irreducibly complex structures. Scientific reviewers have conceded that Behe's description of the molecular evidence is accurate. They refuse to consider intelligent design on philosophical grounds, because they think that "science" requires an unquestioning adherence to materialism.
4. Embryology is continually misrepresented as demonstrating a pattern of ancestral inheritance at the beginning, with diversity emerging in later development. This kind of pattern would support the common ancestry hypothesis, but the facts are otherwise. The earliest stages of development, contrary to the impression given by the NOVA program and the textbooks, are radically different.
5. The public advocates for Darwinism approach their subject with a messianic zeal that contradicts their claim to be objective, dispassionate, scientists. They reveal or omit evidence depending upon whether they think it will help them to convince the public. They rely heavily on ridicule, and on appeals to their own authority, to defend their position.

"Evolution," as defined by the NABT, is a materialist philosophical doctrine that contradicts the best available scientific evidence. You say that we who doubt are prejudiced, are ignoring mountains of scientific evidence, and so on. Baloney. The crucial mechanism that supports the materialism rests upon a huge, unjustified extrapolation from very limited evidence of variation in fundamentally stable populations. Neo-darwinism survives only by the selective use of evidence, and because materialist philosophy has no alternative.

Best regards,
Phillip