§ 9. Excursus on Creation of Life and Biological Diversity
Lecture 31
Examining the Thesis of Common Ancestry

In our last class we saw that the word "evolution" is an accordion word with a wide variety of meanings. Specifically we identified three senses in which the word is often used. First, it's used to simply describe descent with modification. At the most this would imply the thesis of common ancestry – that all organisms are descended from a prior organism. Secondly, it can be used as a description of the evolutionary tree of life – a reconstruction of evolutionary history. And, thirdly, it can be used to describe the mechanisms for evolutionary change. In the neo-Darwinian synthesis this refers to random mutation and natural selection. We saw, according to Francisco Ayala, one of the most eminent evolutionary biologists of our day, that although biologists accept evolution as a fact in the first sense of the word (that is to say, descent with modification), the other two meanings of the word remain a matter of investigation and are often quite uncertain and even conjectural.

Before we look in more detail at these different aspects of the current evolutionary paradigm I want to correct a mistake that I made in a previous class in response to a question. This week an evolutionary biologist emailed me and said that I misspoke when I said that all of the current animal phyla that exist in the world were already present in the Cambrian and that there had been an attrition of those phyla. I looked into this, and what I found is that in the pre-Cambrian fossil record there are about one to three phyla that are already attested at that point. Then in the Cambrian stratum there appear about 20 phyla. That would make then a total of 23 phyla that existed at the time of the Cambrian. There has been a winnowing of that number. Some have since gone extinct. But what I did not realize was that since the Cambrian, 4 more animal phyla have arisen in the fossil record, and that there are around 9 phyla that are extant today but have no remains in the fossil record whatsoever. So that would make about 13 phyla that have arisen – animal phyla that is – that have arisen since the time of the Cambrian. So at the time of the Cambrian you had around 23 extant phyla. Some of those have gone extinct, but then since then 13 more phyla have appeared in the evolutionary record. So just to set that straight.

When we look at these three different aspects of the current evolutionary paradigm that I just mentioned, the second one (that is to say, reconstructing evolutionary history or the tree of life) is really just the outworking of the other two. So I want to focus on the thesis of common ancestry first, and then second the neo-Darwinian mechanisms of evolutionary change. Let's talk first about the thesis of common ancestry.

Are all living things descended from a single primordial ancestor? Here the evidence seems to be mixed. The strongest evidence in favor of the thesis of common ancestry derives from the genetic similarity of virtually all living things. Almost all living organisms share the same genetic code or DNA. In fact, it's striking how similar organisms are in their DNA to one another. Moreover, this genetic similarity between organisms corresponds to their position on the evolutionary tree of life. Organisms on the same branch of the tree are much more similar to each other genetically than they are to organisms on a different branch of the tree. For example, a bat and a whale are much more similar genetically than a bat and a lizard or a bat and a sponge. This genetic similarity provides evidence of common ancestry since sharing a common ancestor would explain why all living things share the same genetic code and why the more similar that animals are to each other the more genetically alike they are. The creationist could respond to this argument by saying that God simply used the same design plan over and over again in creating different biological lifeforms. The genetic similarity of different organisms doesn't imply that one has evolved from the other. Rather, God has simply built them on a similar genetic design plan. To give an analogy, Ford and General Motors use the same sort of design plan to manufacture their automobiles, but that obviously doesn't imply that a Chevrolet has evolved from a Ford. They simply have similar design plans. So one could perhaps say that God repeatedly used the same design plan in creating various organisms. Namely, he used the same fundamental sort of genetic structure for the different unrelated organisms that he created. There was no reason to reinvent the wheel each time.

Now, I think we have to say that that certainly is a possibility, but it might seem more plausible to say that the genetic similarity of all living things is due to their being related to each other by descent. The biologist Dennis Venema of Trinity Western University outlines three specific points about the genetic phenomena which are difficult and rather awkward for the special creationist to account for.[1]

First of all, he says the genetic similarity between organisms is far in excess of what is required in order for DNA to do its job. A strand of DNA, if you remember your high school biology class, serves as a template to make messenger RNA for a short region spanning a gene. The next step then is to translate the messenger RNA into a sequence of amino acids in order to synthesize various proteins. The DNA letters A, C, G, and T (these are called nucleotides) combine with each other in sets of three to specify various amino acids. They form triplets. For example, A-C-T, C-G-A, and so on and so forth. The genetic code permits exactly 64 different combinations of these nucleotide bases. This is 4^3. You form 4^3 triplets and you get 64 different combinations of these nucleotide bases.

[1] Dennis R. Venema, "Genesis and the Genome: Genomics Evidence for Human-Ape Common Ancestry and Ancestral Hominid Population Sizes," *Perspectives on Science and Christian Faith* 62 (2010): 166-78.

But these 64 different combinations do not specify 64 different amino acids, interestingly enough. Instead they only code for about 20 amino acids. Often the same amino acid can therefore be produced by different nucleotide combinations. The different combinations will produce the same amino acid. So two organisms wouldn't have to share the same genetic similarity on the deep structural level of the genetic code in order to have the same amino acid sequences and so be the same kind of animal. And yet, time and time again we find that organisms which are thought to be related share not only similar amino acid sequences but also they share the deep similarity of the genetic code combinations. This deeper unnecessary similarity would be explicable if organisms share a common ancestry and so inherited their genetic structure. But it would seem to be unmotivated if each one were simply a special creation.

Secondly, he points out the organization of the genes of related organisms suggests common ancestry. Two species which are thought to have recently diverged from a common ancestor have not only many of the same genes in common but also the same ordering or sequence of the genes along their DNA. This similarity of ordering is not necessary in order for the organisms to have similar body plans and function. So special creation seems to leave this similarity unmotivated whereas common ancestry would make it intelligible why these species derived from a common ancestor would have not only the same genetic code but would also have the same ordering in the sequence of the genes.

START DISCUSSION

Student: Both the first point and the second point say there's no need to have that similarity, but that doesn't mean that the similarity couldn't have been there if God intended it to be.

Dr. Craig: Quite right. It's interesting. When Venema addresses this, what he says is if you were designing two languages and you wanted people to know that they were independent rather than derived from the same thing, wouldn't you make them different? I thought, what is he trying to engage in here – divine psychology? He's attributing to God the desire to make it evident that these organisms don't share a common ancestry and and therefore he would be duplicitous if he chose to do it this way? It seemed to me, as you point out, that this is a kind of philosophical point about divine psychology that makes the argument not quite as compelling as it might appear at first. So that’s a fair point, I think.

END DISCUSSION

Thirdly, Venema points out the presence of shared so-called pseudo-genes in related organisms suggests common descent. What is a pseudo-gene? A pseudo-gene is a defunct genetic sequence that has been inactivated through mutation. It was once a functional

gene but it has mutated and now so no longer functions in the organism in which the pseudo-gene is found. Organisms which are thought to be closely related are found to have the same non-functioning pseudo-genes even in the same order even though these defunct genes do nothing in either organism. Such similarity would make sense given common ancestry. The descendant would inherit the pseudo-genes as well as the functioning genes of his ancestor. But it's hard to explain why God would reproduce in one organism the broken parts of another organism. To borrow the automotive analogy once more, it's hard to see why a designer and manufacturer would reproduce in one model the broken and non-functional door handle in an earlier model.

START DISCUSSION

Student: Does he give any examples?

Dr. Craig: Yes, thank you. The example he gives I kind of wanted to hold off a little bit because it will be inflammatory. But the example is the similarity in human beings and chimpanzees with respect to olfactory genes. These are genes that give you a sense of smell. What you discover is that chimpanzees have the same defunct pseudo-gene in the same order that has been mutated, and we human beings have the same thing even though it serves no purpose. So it would seem that we and the chimpanzees are both descended from a common ancestor. A different example would be whales and hippopotami, of all things. Whales were once thought to be land animals. They're mammals after all. They still breathe the air, right? So whales also have a pseudo-gene for the olfactory sense, and it's very similar to the one in hippopotami. This led scientists to think that the ancestors of whales were the same as the ancestor that evolved into hippopotami. What was discovered then later was fossil evidence of primitive animals that shared similar ankle bones in hippos in marine mammals. They showed a fossil similarity. That fossil similarity seemed to confirm what the genetic evidence had already suggested. That would be a couple of examples that Venema mentions. There are others as well that are examples of these pseudo-genes. I think you would agree that this is, I think, a more persuasive argument than the first two that we just mentioned. It really does seem to be more plausible to explain these pseudo-genes as a result of inheritance rather than to think that a designer would reproduce broken parts from some other independent organism in an organism in which they serve no purpose.

END DISCUSSION

These arguments, I think, are far from compelling. And even if persuasive fall far short of demonstrating anything so sweeping as the thesis of common ancestry. But they do make special creation look rather *ad hoc* in light of the evidence. So the genetic evidence is one of the best evidences in support of the thesis of common ancestry.

START DISCUSSION

Student: With the similarities when we say that the two organisms have very similar genetic makeup, I think I watched something recently from the ID theorists where they say that the parts that they used to say were the junk DNA is no longer. They've actually found functionality with that. When they say it's similar, is it accurate to say that they're only accounting for the part of the genetic code that codes for proteins and not all the other strands out there? So when they're looking at it, they say the strands that are coding is like 99% the same but then when you add all the rest of the so-called what they used to call junk DNA no longer the similarity isn't as similar as it used to look like.

Dr. Craig: I'd have to look at that more closely to be able to answer with confidence. It's hard to believe that someone like Venema could overlook that point, but I'd have to look again to see if he's talking about the whole genome or just, as you say, those operating coding parts of it.

END DISCUSSION

On the other hand, the fossil evidence stands in opposition to the doctrine of common ancestry. When Darwin proposed his theory, one of its major weaknesses was that there are no organisms around today which stand midway between other organisms as the transitional forms between them. We don't see transitional forms between the animals that are living today. Where are they? Darwin answered the objection by saying that these transitional animals which existed in the past have become extinct and eventually their fossil remains will be discovered. However, paleontologists have unearthed a good deal of fossil remains of extinct animals since Darwin published his *Origin of the Species*, and by and large they have not found these transitional forms. Instead, what they have found are just more distinct animals and plants which have died off. These extinct forms are simply like leaves on the canopy of the evolutionary tree of life. The common branches that connect the leaves have not by and large been found. Ian Tattersall of the American Museum of Natural History (whom I quoted previously) writes as follows:

> The [Modern] Synthesis. . . elegantly explained virtually all evolutionary phenomena in terms of the gradual accretion of genetic changes in evolving lineages, under the guiding hand of natural selection. . . . The implication of this was that the fossil record should consistently show smooth intergradations from one species to the next; but, inconveniently, it too often didn’t. Species, it has turned out, tend to appear rather suddenly in the fossil record, to linger for varying but often very extended periods of time, and to disappear as suddenly as they arrived, replaced by other species which might or might not be closely related to them. For a long time–indeed, since Darwin himself–this failure of the fossils to accord with expectation was explained away by the famous incompleteness of the record. But as the years passed and more and more fossils were found, the

> predictions of the Synthesis became increasingly out of sync with what was actually there. The time was evidently ripe for a reappraisal of paleontologists' expectations from theory –and thus of the theory itself.[2]

In 1972 Niles Eldredge and Stephen Jay Gould published a paper entitled "Punctuated equilibria: an alternative to phyletic gradualism." Eldridge invoked what he called allopatric speciation to explain evolutionary change. You can remember the meaning of this word by its etymology. "Allo" means "other" or "different" and "patric" comes from the same root that words like "patristic" or "paternity" or "paternal" come from. In contrast to someone who is a compatriot (that is to say, shares your same country), allopatric would mean belonging to different regions. This allopatric speciation occurs when a geographical barrier of some sort separates a widespread species into isolated populations, and then the isolated populations evolve differently. The process of geographical separation followed by reproductive isolation has the effect of dramatically decreasing the size of the gene pool in the new species. Small gene pools belonging to smaller populations are inherently more unstable than large ones. The new species will therefore be more susceptible to change than the parent species, and this change may prove to be adaptive in the new situation. So evolutionary change is seen on this theory as being a rapid but sporadic process whereby a single parent species gives rise to two separated daughter species.

According to Punctuated Equilibria evolutionary change is still gradualistic. The theory is not positing leaps of evolutionary development. But the transitional forms would have been isolated in local populations which may have been quite small. Because of their local nature the remains of such transitional forms will be harder to find and therefore much rarer. Nevertheless, it still needs to be said that the almost complete absence of such forms in the fossil record still remains striking even on Punctuated Equilibria.

It's important to understand in this connection the difference between intermediate forms and transitional forms. It is certainly true that there are fossil remains of various intermediate forms, for example, the famous Archaeopteryx which is a bird but has both reptilian as well as avian features. For example, the Archaeopteryx has teeth in its beak and has claws on its wings and so has certain reptilian features. But an intermediate form is not the same thing as a transitional form. An intermediate form is an organism which exhibits features of two different kinds of animals. It looks like a blend of these two different kinds of animals. A transitional form is an organism which is the evolutionary bridge from an earlier animal to a later animal. An intermediate form may not be a transitional form. For example, Archaeopteryx is an intermediate form in that it exhibits the features of both birds and reptiles, but it's not a transitional form between reptiles and

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[2] Ian Tattersall, *The Fossil Trail: How We Know What We Think We Know about Human Evolution*, 2nd ed. (Oxford: Oxford University Press, 2009), p. 151.

birds. Birds appear in the fossil record millions of years before Archaeopteryx appears. So it is not the evolutionary bridge between reptiles and birds. The same is true of the famous feathered dinosaurs. These are not dinosaurs on their way to becoming birds. They are intermediate forms but they are not transitional forms.

If the thesis of common ancestry is correct, we're not talking about there being a few intermediate forms in the fossil record like Archaeopteryx. Rather, as Michael Denton emphasizes in his book *Evolution: A Theory in Crisis*[3], if the thesis of common ancestry is true there should be literally millions and millions of transitional forms in the fossil record. Think, for example, of all the transitional forms that would have to exist in order for a bat and whale to have a common ancestor. And yet they're not there in the fossil record. Moreover, a bat and a whale are actually rather closely related in the grand evolutionary scheme of things in that they're both mammals and they're both vertebrates. How many transitional fossils should there be for a bat and a sponge to be descended from the same ancestor? This problem can no longer be dismissed by saying that we just haven't dug deep enough. The transitional forms have not been found because they are not there to be found.

START DISCUSSION

Student: Are there any examples that they put forth as transitional fossil remains?

Dr. Craig: There must be, but I can't name one off the top of my head. You have, of course, earlier versions of the same animals, but to have an actual transitional form between two species would be harder to find. I can't think of one off the top of my head.

Student: The difference between a species (which is kind of our man-defined grouping of morphology and various things) and kind. The Bible says the kinds – animals followed their kind. Species is something we've defined. Dachshunds and dingos and cocker spaniels and coyotes are different species but they're all part of the dog kind. I think we have to be careful when we say . . . I think species is rather amorphous, but not kind.

Dr. Craig: I think the point you are making is quite right that Genesis, even taken literally, doesn't commit you to the fixity of species because that's a modern biological category that you can't impose on these ancient Hebrew writers. The author of Genesis 1 isn't trying to write a scientific treatise on the classification of animals. If you want to see such a classification, take a look at Aristotle's work on the different kinds of animals. Aristotle actually does write a book in which he offers a classification of various animals. It's intended to be a scientific treatise, and that's not what Genesis is. So by no means I think are we committed as Bible-believing Christians to the fixity of the species.

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[3] Michael Denton, *Evolution: A Theory in Crisis*, (Chevy Chase, MD: Adler & Adler, 1986).

Student: I'm trying to understand better what is meant by the term "intermediate form." I had the thought if, for example, bats and platypuses did not exist today but someone found them in the fossil record, would they be hailed as an intermediate form?

Dr. Craig: Ah! That's interesting. I don't think anyone would think that a platypus was a transitional form between ducks and mammals, or ducks and beavers, for example (even though it has a bill; it has some features that look like a duck). Or, to give another example, you've probably heard of so-called lungfish which exists today. These are fish which can crawl up out of the water onto the shore and breathe for a while and get along in air before they go back into the water again. They are hypothesized to be very much like the imagined transitional forms when the life came out of the primordial seas and moved onto the land. But the lungfish are not themselves these transitional forms. They're intermediate in that they have amphibian and fish-like features, but they're not the evolutionary bridge from one to another. By an intermediate form, what we mean is something that blends features found in different organisms.

END DISCUSSION

By way of summary, the data concerning the doctrine of common ancestry are mixed. I think that the genetic evidence does lend support for it, but the fossil evidence seems to tend against it. The absence of transitional forms in the fossil record combined with the evidence of genetics suggests that if the thesis of common ancestry is true then something is wrong with the explanatory mechanisms of neo-Darwinism. The explanatory mechanisms need to give a good account of both the genetic and the fossil evidence. Next time we will turn to an examination of those neo-Darwinian mechanisms.[4]

[4] Total Running Time: 35:36