

## **Genesis and the Beginnings of Humanity**

How do we handle the apparent contradictions between the book of Genesis and modern scientific findings about human origins? Any child who grows up in a Christian household will sooner or later need to come to grips with the fact that what he has been learning in his religious instruction and in his Bible reading appears to collide head-on with what he has been learning in his biology class. The purpose of this paper is to seek a solution to the problem that is consistent with well-supported scientific claims, but at the same time is also consistent with our view that the book of Genesis, like the rest of the Bible, is God's Word.

### **Evolution vs. Special Creation**

A straightforward reading of the story of Adam and Eve seems to indicate that humans were created separately from all other species. What does science tell us?

It is the overwhelming consensus of the scientific community that humans arose through evolutionary processes. This is true even among scientists who believe in Christianity. There are two principal lines of evidence.

One is the fossil record. Evolutionary theory predicts that, since humans are closest anatomically to the apes, there should have been species intermediate between apes and humans in the recent geologic past. Fossil discoveries have indeed confirmed the existence of a number of different species with overall characteristics somewhere intermediate between humans and apes. In particular, some of these fossils show cranial capacities at various values between that of modern apes and modern humans. If humans were created separately, it is reasonable to ask why God would have created these species, only to allow them all to become extinct. And why did he have the larger-brained species appear more recently in the past?

Another, more convincing line of evidence has been provided by genetics. There are many examples of genetic discoveries confirming evolution, but I will only devote space to one of them.

Of all other species on the planet, the DNA of chimpanzees is closest to that of humans; overall, the agreement is about 98-99%. Humans have 23 pairs of chromosomes, but chimpanzees and other great apes have 24. It turns out that this gives us a tremendous opportunity to test evolution. According to evolution, humans and the apes share a common ancestor. We can explain these observations by supposing that this ancestor had 24 pairs of chromosomes, and that somewhere in our past, after the lineage that led to humans diverged from that of the chimpanzees, two chromosomes fused together.

But how can we test this hypothesis? At each end of every chromosome is a special DNA sequence known as a telomere. This sequence does not normally appear anywhere else in a chromosome. If two chromosomes in a human ancestor fused at their ends, then

at the fusion point we should find telomeres. In comparing human and chimpanzee chromosomes, it is fairly obvious which one should have been created in a fusion event. If we line up the chromosomes of the species, we find that for each of 22 human chromosomes, we can find a chimpanzee chromosome that closely resembles it. If we compare the remaining human chromosome with the two remaining ones belonging to the chimpanzee, it turns out that the length of the human chromosome is about equal to the sum of the lengths of the two chimpanzee chromosomes. This is just what we would expect from evolutionary theory.

But this is the acid test: Are there telomeres at the midpoint of the human chromosome, where the two ancestral chromosomes would have fused? If not, evolution is in trouble. But if so, it is a startling confirmation of evolution, because there is no reason for telomeres to exist at this site if evolution is incorrect.

In fact, there are telomeres at the site. They have experienced many mutations, but that is just what evolution predicts – since the telomeres would no longer have any function after the fusion took place, mutations would not threaten the survival of the creatures that inherited the chromosome, and the changes would accumulate over time.

If God created humans separately, why did he put mutated, nonfunctioning telomeres at precisely the site where evolution predicts they should be? The only possible conclusion would be that God is playing tricks on us – he deliberately created us with an appearance of evolution, even though he did not actually create us that way. In other words, he has deceived us. But why would he do that? Is it so that those who are not open to the existence of God would have a way out? Atheists do not need evidence this convincing to embrace evolution; indeed, many were convinced of it even before Darwin. And of course God must have anticipated that those open to belief would learn of the evidence and also be deceived. No, this possibility must be rejected.

Moreover, what I have presented above is only the tiny tip of a very large iceberg of evidence. Even with the chromosome comparisons, there is much more that could be said. Two conclusions seem inescapable: 1) God created humans through evolution; and 2) he thinks we should be OK with that. Why would he want believers to struggle?

### **The Place of Origin of the Human Species**

According to a literal reading of the Genesis narrative, humans originated in the Fertile Crescent area, near the Tigris and Euphrates rivers. This presents another problem. Strong evidence supports the origin of the human species in Africa. Again, one line of evidence is the fossil record; this is where the oldest distinctly human fossils are found.

Now, however, genetics has provided a new line of evidence. As time goes on, mutations accumulate in populations. As a result, the longer a population has been residing in a particular area, the greater its genetic diversity becomes. Suppose the human species originated in a certain place. For some period of time, the species would remain there, and continually increase in diversity. At some point, however, a small group would leave

that area in hopes of finding a better habitat. That group would only contain a small subset of the DNA in the whole human population. In time, genetic diversity in the group would increase, but it is unlikely ever to catch up with the level of diversity of the people who stayed in the place of origin. In general, the longer a population has been living in a particular place, the more diverse it will be. And there is no doubt about where overall genetic diversity is greatest – it is in Africa.

This is also the conclusion of two particularly useful methods of tracking human migrations. One is mitochondrial DNA. Mitochondria are found outside of the nucleus of the cell, and we inherit them only from our mother. None of the father's mitochondria enter the fertilized egg. So a person's mitochondria came from his or her mother, and her mitochondria from her mother, and so on throughout the generations. When we examine the DNA, we are examining ancestry through the maternal line.

Why is this such an advantage? When the sperm and egg cells are formed, the chromosomes in the nucleus undergo recombination. Essentially, the two members of a pair combine together to form a single chromosome. This means that a chromosome is not preserved intact as it passes from one generation to the next. If we imagine tracing the ancestry of a chromosome backwards in time, the number of ancestors keeps multiplying, since DNA is passed on through both the mother and father. With mitochondria, this is not a problem. Similarly, the Y-chromosome found in men does not recombine as it is passed down, and it can also be used to learn about the history of human populations. Changes do occur in the DNA due to mutations, but this happens relatively slowly.

When we examine mitochondrial DNA, we find that the diversity in sub-Saharan Africa is about twice that of the rest of the world put together. Diversity is also greatest in this region for Y-chromosome DNA, although the difference is not as dramatic. In addition, a study of the X-chromosome has indicated that its diversity in sub-Saharan Africa is nearly twice that of the rest of the world. When all the evidence is considered, there is little doubt that our species is indeed of African origin.

### **The Time of Origin of the Human Species**

DNA can give us information about how long humans have been on our planet. For example, when we look at Y-chromosome DNA, we can compare mutations in different men in all parts of the world. Since we know approximately the rate at which these mutations accumulate, we can estimate how long it would take for a single Y-chromosome to eventually acquire the observed differences as it is passed down through the generations to greater and greater numbers of men. It appears that we all have a common ancestor on the paternal side, a man who lived somewhere around 50,000 - 60,000 years ago. We can do the same for mitochondrial DNA on the maternal side, and we find that there was a woman who lived perhaps 170,000 years ago who was a common ancestor for us all.

These individuals are often referred to as “Adam” and “Eve”, but they were not the Adam and Eve of the Bible. They didn’t even live anywhere close to one another in time. Moreover, at the time Eve lived, there were undoubtedly many other women alive. And we have their DNA in us also. But we don’t have their mitochondrial DNA, because this can only be passed down through the maternal line. If a woman had sons but no daughters, she could pass down her nuclear DNA to subsequent generations, but not her mitochondria. Eventually, after many generations, the mitochondrial lineages of Eve’s contemporaries died out. Similarly, at the time Adam lived, there must have been many other men. But we don’t have their Y-chromosomes, because when men have only daughters, their Y-chromosomes don’t get passed down, and eventually the other men’s lineages died out. But we do have DNA from their other chromosomes. Studies in population genetics indicate that at the time of emergence of the human species, there likely was a founding population in the thousands.

Incidentally, these findings are consistent with the fossil record, which also shows that humans emerged over 100,000 years ago. But how well does this fit with Genesis? If we read it very literally, it appears that all humans are descended from only two individuals. If we add up the years separating the generations in the genealogies, we find the first humans lived about 6000 years ago. If we allow for the possibility that generations have been skipped and that the years are not meant to be taken too literally, we could extend this backward quite a bit further. Even so, we see evidence in the early chapters of Genesis of agriculture, the keeping of flocks, and the building of cities, activities which archaeological studies indicate humans did not engage in until perhaps around 10,000 years ago.

Of course, the numbers I have presented are only estimates. For example, it is possible agriculture may have begun a few thousand years earlier than domesticated plants appeared. Or perhaps the estimates of when “Adam” and “Eve” lived will have to be revised downward. Still, it appears highly unlikely that the gap will ever be closed. So how do we reconcile the different pictures presented by science and Genesis?

### **The Nature and Purpose of Genesis**

In resolving the difficulty, it is essential to understand what purpose lies behind the early Genesis narratives. It was never intended to be a scientific treatise on how God created everything. Its real purpose was primarily theological. The ancient Israelites were surrounded by pagan cultures that had their own creation stories, and these stories were quite different from Genesis. They depicted many gods, not one, and humans almost as an afterthought, or a byproduct of conflict between rival gods. The purpose of Genesis is to convey the message that there is one God who created us deliberately, that we are the most special part of his creation, and that he longs to have a relationship with us based on obedience. The Adam and Eve story also has things to tell us about God’s purpose in marriage.

Having said this, should we view the early Genesis narratives as completely fictional or mythological? I believe this is going too far in the other direction. The linking of the

various names into genealogies tells me that the author of Genesis considered these people to be real, historical individuals. And if that is the case, it is hard to believe that the stories do not correspond to anything these individuals actually did. Probably the best way to view the narratives is that they deal with real people and are based on real events, but they are not intended to be a strict, literal account of those events. Had they been written in such a way that they were literal history, I think the stories would have been much longer, much more complex, and much less effective in delivering the theological messages that Genesis was intended to convey. Sometimes it is better to simplify, and not distract the reader with details he does not need to know about. There would have been no need for the ancient Israelites to know anything about evolution, and introducing evolution into the creation narrative would probably have generated great confusion. In the case of the Adam and Eve story, presenting the underlying events through symbolic language was probably especially powerful. As the Genesis author composed his early narratives, he may also have chosen details specifically for the purpose of refuting the pagan stories.

An objection might be raised that the New Testament treats the stories as literal history. For example, in 1 Corinthians 11:8, Paul says that woman came from man, an obvious reference to Eve being created from Adam's rib. But I don't believe that the validity of Paul's point depends on the details being understood literally. As long as the creation story was inspired, Paul could legitimately draw from it to make his points. To make an analogy, I don't think the author of Hebrews believed that Melchizedek historically was "without father or mother, without genealogy, without beginning of days or end of life" (Hebrews 7:3). Presumably Melchizedek had an actual mother and father, was born, and died, like everyone else. The author of Hebrews seems to be talking about the way Melchizedek is presented in Genesis (i.e., without a genealogy) and how this foreshadows Christ, rather than trying to make an historical statement.

Similarly, one might argue on the basis of 1 Corinthians 15:21-22 that Adam could not have been a product of evolution, because then death would not have come through him. Certainly his ancestors all died! But if Adam and Eve represent, not the first members of the human species, but the first members with God-breathed human souls, then I don't think there is necessarily a problem. The Bible is not interested in what happened with our species before we acquired souls, any more than it is interested in what happened with, say, *Homo erectus*. From God's perspective, the story of human history really began when we became something more than just intelligent animals.

### **Synthesizing Genesis and Science**

When, then, did humans first acquire souls? Unless the years mentioned in the genealogies in Genesis have no historical value at all, it appears this happened within the last 10,000 years. This would explain why the early Genesis narratives mention agriculture, the keeping of herds, and the building of cities. It also would explain why the human story in Genesis begins in the Fertile Crescent region, in the vicinity of the Tigris and Euphrates rivers, rather than in Africa – because that is where these activities appear to have originated.

By allowing scientific knowledge to inform our reading, we can even explain some features in Genesis that would otherwise be puzzling. Where, exactly, did Cain get his wife, if the only people around were Adam and Eve and their sons? Genesis 5:4 says Adam later had daughters, but this is certainly an unsatisfactory explanation, given what the Bible says about incest, and there is nothing to suggest this in Genesis 4:17. In reality, it would not have been a problem for Cain to find a wife – at the time he lived, there were plenty of women around who were not related to him! Likewise, his building of a city (4:17) and his fear of harm from others (4:14) make better sense if there were many other people living at the time.

But if humans acquired souls within the last 10,000 years, are we all physically descended from Adam and Eve? Clearly, we could not be descended only from them. If that were the case, the Y-chromosome evidence indicates Adam would have to have lived tens of thousands of years ago, and Eve quite probably over 100,000 years ago. But if we insist that all of our DNA comes only from Adam and Eve, we are in trouble regardless; as noted above, population genetics indicates that we are likely descended originally from a group of thousands, not two.

So if Adam and Eve lived very long ago, we could all have them as ancestors, but they would not be our only ancestors. On the other hand, if they lived within the last 10,000 years, many people in the world could not be descended from them at all. By that time, humans had migrated all over the world, and it is highly unlikely, for example, that Native Americans could be descended from them. Is this a problem? One might argue that Eve's name means "mother of all the living," and so it is important that we all have her as a physical ancestor. On the other hand, we certainly wouldn't argue that Jubal (Genesis 4:21) was a physical ancestor of all who play the harp and flute (as opposed to those who don't play a musical instrument). He was simply the first. Likewise, the Bible refers to Abraham as the father of all Christians, even though we are his children spiritually and not physically. I believe Eve could have been the mother of humanity in the sense that she was the first woman to be a spiritual being.

That being the case, it must have been necessary for God to infuse souls into humans at various times and places, separately and independently from the first such occasion. By biblical times, presumably, all members of our species had them. This view may seem unorthodox to some, but I don't think there's anything unreasonable about it.

Incidentally, after agriculture and civilization began in the Fertile Crescent region, it appears to have also begun independently at several different times and places around the world over the next several thousand years. After over 150,000 years of hunting and gathering, why did different groups of humans start these activities independently over such a relatively short time? Certainly, an important factor could be the end of the ice age and the warming of the planet, beginning around 12,000 years ago. Still, it is not clear why these activities could not have begun at earlier times when the ice had receded. Could part of the reason be that it was only in recent times that humans had souls? Did

this give them an advantage their ancestors lacked? This is admittedly speculative, but I think it's an interesting possibility.

### **The Problem of the Flood**

One problem remains, however. If humans acquired souls that recently, then the flood must have occurred even more recently. Can this be reconciled with the scientific evidence?

If we insist that the flood covered the whole earth and that we are all descended from eight people on the ark, we are clearly in trouble. In that case all men have inherited their Y-chromosomes ultimately from Noah, and so Noah must have lived tens of thousands of years ago. Also, all of our mitochondrial DNA would ultimately have come from the three wives of Noah's sons. If the wives were closely related, then they evidently would have lived over 100,000 years ago, if we are to account for the diversity we observe today. We might try to get around this by supposing that one was very distantly related to the other two, or all three were distantly related. Even then, though, if the flood happened only in the last several thousand years, we have a problem. When we examine human mitochondrial DNA from around the world, we would expect to see two or three distinct clusters, with relatively little diversity within each cluster. This is not what we see at all. Just in Europe alone, there are seven distinct mitochondrial clusters, some with enough diversity to indicate ages of a few tens of thousands of years.

Pushing back the date of the flood still leaves other problems, however. If only Noah's family survived the flood, then we would expect to see the greatest genetic diversity in the region where Genesis says Noah's family left the ark, not in Africa. All the diversity that had been building in Africa up to that point in time would have been wiped out. And then there are the studies that indicate that the human population probably originated in a group of thousands of individuals, not a handful.

In any case, there would not have been room on the ark to accommodate the tremendous biological diversity we see on the planet today. Nor would there have been time for evolution to create the present diversity from a smaller, less diverse group of animals. And then we have the problem of why so many species are found only in certain locations, e.g. particular islands, if all species have migrated from one point on the earth's surface. Clearly, the solution must be that the flood was limited in geographic extent. It is not necessary to read the flood narrative so literally that we understand the flood to have covered the entire planet. In that case, life could have gone on as usual outside of the affected region, and the difficulties in reconciling science and the biblical text disappear.

### **Conclusion**

The real point of this paper is that we should view modern scientific findings and Genesis as complementary rather than contradictory. Science accurately tells us how God brought our species into existence, and can even tell us details about when and where

humans lived. Genesis tells us who God is, what his purposes are, and how we relate to him. It accomplishes this through narratives that, like the rest of the Bible, are based on real events. However, the stories should not be accorded the level of literal accuracy that we would normally give to other stories in the Bible. When we take this approach, I believe it is possible to create a fit between Genesis and science by supposing that long after our species evolved, God began infusing souls into us, beginning perhaps 6000-10,000 years ago in the Near East. Because of our literal-minded modern culture, our own preference would probably be for Genesis to have the same level of historical precision as, say, the Gospels. But as confusing as these stories may sometimes seem to us, they served their original audience very well.

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