



In the previous essay of this series, we considered the fossil record as one piece of evidence in support of the theory of evolution. Here, we will discuss three additional threads of the web of evidence for evolution taken from organismal biology, from molecular biology, and from biogeography.

Organismal Biology: If evolutionary theory is true, then organisms should bear marks of their evolutionary history within their bodies. Biologists point to so-called vestigial organs as one of these marks. Vestigial organs are organs or structures in a living species that have apparently lost most or all of the function associated with their ancestral species. Their existence is best explained by the evolutionary history of the living species.

For example, whales and dolphins have a rudimentary pelvis or hipbone. Snakes and legless lizards have rudimentary pelvic bones as well. Why would these animals that lack limbs have a hipbone? Strikingly, whale, dolphin, snake, and legless lizard embryos initially develop embryonic hind legs or limb buds though these are reabsorbed by the developing organism before birth or hatching. Why do these animals have these transient rear limbs during their development?

The best explanation is that these creatures evolved from an ancestor shared in common with four-limbed animals, and that the vestigial hipbone and their vestigial embryonic limbs are marks of that evolutionary history.

In the human species, it is striking that the embryo initially develops a tail during his development in his mother's womb. At between four and five weeks of age, the human embryo has a dozen or so developing tail vertebrae which extend beyond his anus and his legs, accounting for more than 10% of the length of his body. By the ninth week of pregnancy, however, most of this extensive embryonic tail has undergone regres-

sion by a mechanism of programmed cell death. Why do we have these transient embryonic tails?

Once again, the best explanation is that we evolved from a primate ancestor that had a tail and that we retain a rudimentary genetic program for making tails. Incidentally, this would also explain those rare human beings who are born with an actual tail, which can be as long as 5 inches and which can move and contract. Here the normally silenced tail-making genetic program is reactivated and a rudimentary tail is made.

Molecular Biology: In recent years, biologists have been able to decode the information found in the DNA of numerous species of life—called

The Web of Evidence for Evolution / Part II

Rev. Nicanor Austriaco, O.P.

their genomes—from bacteria to the pufferfish to the kangaroo to the human being. Biologists have then been able to compare the genetic information of these diverse organisms to determine their similarities and differences.

Two discoveries from this comparative analysis stand out. First, all the genetic information in these diverse species is written in the same language, the same genetic code. Bacterial DNA, kangaroo DNA, and human DNA are all written with the same four chemical “letters,” denoted by G, A, T, and C. Second, closely related species share more genetic information than distantly related ones. Thus, human beings share 96% of their genetic information with chimpanzees but only 75% of their genomes with pumpkins.

Why is this so? Evolutionary theory proposes that the common code and the resemblance between DNA genomes of related species is a mark of their common ancestry.

To illustrate the reasoning, imagine that you are a high school teacher who is grading ten essays. You discover that five of these exams are similar to each other, with similar wording and phrase usage, and that two of these five have identical sentences. You therefore conclude that these exams have a common ancestry. It is likely that they are all descended from a single exam that was copied and shared among the cheaters, and that the two identical exams have a more recent ancestral connection where one was copied from the other.

According to the same logic, evolutionary biologists posit that organisms with similar genetic information have a common ancestor and that species with more similar genetic information have a more recent ancestor than those with dissimilar genomes. This is not a complex scientific argument. It is one based on ordinary everyday logic and reasoning.

Biogeography: Biologists have discovered that different locations on the planet with comparable geographical characteristics are actually populated with different kinds of organisms with comparable traits.

For example, desert flora have adapted to the extremes of heat and aridity found in those habitats. They are often succulents that have thickened and fleshy leaves and stems that are used to retain water. And yet different deserts have different types of succulents. In North and South America, the succulents are members of the cacti plant family, while in Asia, Africa, and Australia, the succulents are members of the euphorb plant family. How do we explain this specific pattern in the global distribution of succulents?

Evolutionary theory can account for this non-random distribution of succulents by the distinct evolutionary histories of the plants that evolved independently of each other in different but similar habitats on the planet.

In another example, mammals are found throughout the world in different geographical

habitats. In most of the world, these habitats are populated by mammals that have placentas that allow their young to develop within their mothers. Flying squirrels, anteaters, and moles are

examples of placental mammals. In contrast, in Australia, the parallel habitats are populated by marsupial mammals that have pouches and that give birth to very underdeveloped young. Supergliders, banded anteaters, and marsupial moles are the marsupial mammals that parallel their placental counterparts listed above. How do we explain this specific pattern in the global distribution of mammals?

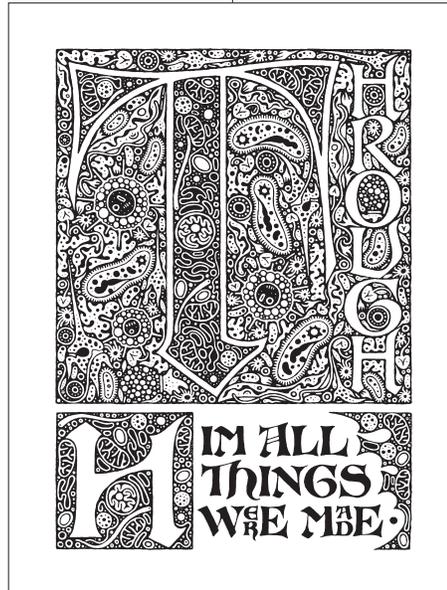
Again, evolutionary theory can explain this non-random distribution of animals by the

distinct evolutionary histories of the organisms that evolved independently of each other in different but similar habitats on the planet.

In sum, the theory of evolution is supported by numerous observations from different areas of biological and paleontological research. It is justified by a web of evidence from the fossil record, organismal biology, molecular biology, and biogeography, among others, that together support the claim that all life on our planet has evolved from a common ancestor.

Common Objection: An objector could argue that the fossil patterns, the organismal patterns, the molecular patterns, and the biogeographical patterns described by biologists and put forward by them as evidence for evolution can be attributed to the creative will of a Creator God who created these patterns without an actual evolutionary process.

In response, a Thomist would point out that the Christian God is a wise and good God who would not intentionally mislead His creatures. Therefore, creation should not hide, but reveal the wisdom, the beauty, and the goodness of the Creator. **T&E**



FIND THIS (AND MORE) ON THE WEB:

<http://www.thomisticevolution.org/disputed-questions/the-web-of-evidence-for-evolution-part-ii/>