

EDITORIAL

GENESIS KINDS AND THE SEA URCHIN

The idea that different types of organisms were created and commanded to reproduce “after their kinds” seems widely believed among creationists. It may therefore come as a surprise to many to learn the idea is not stated in the Bible.

I discovered this several years ago as I prepared a lecture on limits to change in species. I looked up all the Bible texts using phrases such as “after its kind” or “according to their kinds,” and identified the verb associated with the phrase. I found three contexts in which nearly all these texts were located. The first context was creation, and, with one exception, the verb was “created.” The various kinds of animals were “created according to their kinds.” This is referring to the origins of the various kinds of creatures, but says nothing about their reproduction.

The one possible exception is found in Genesis 1:11-12, where the text has been translated as “fruit tree making fruit after its kind”.¹ Here, the author appears to be stating that different kinds of fruit trees would have different kinds of fruits, so that a tree could be identified from its fruit (cf. Matthew 12:33). Thus, the type of fruit produced would remain constant, although the text does not prohibit the tree itself from changing in appearance, and common experience shows that plants are quite variable in structure.

The second context using phrases such as “according to their kinds” is in the description of the animals entering the ark. Here the verb refers to entering the ark, not reproduction. The third context is in the listing of clean and unclean animals, and there is no mention of reproduction here either. In fact, the Bible says nothing at all about creatures producing offspring that are the same as their parents. The idea of fixity of species does not come from the Bible, but from the philosophy of Plato and his followers, who emphasized the notion of ideal types. Individuals might vary from the type, but the ideal remained constant, and variation would be limited.

What, then, is the meaning of the phrase “according to their kinds?” First, it must mean that different kinds of creatures were created within each stated category. For example, the creatures moving in the water were created “according to their kinds;” thus there was a diversity of creatures from the beginning of the creation. Similar conclusions can be drawn for the birds, creeping things, and beasts. Diversity is an original feature of creation. The concept of multiple lineages of independent origin is called “polyphyly.”

Polyphyly is a key component of creation theory. This contrasts with “monophyly,” which is the notion that all living organisms share a common ancestry. Monophyly is the dominant idea in evolution theory, although some evolutionists would accept a small number of independent lineages. The idea of “a few” original ancestors was noted as a possibility by Charles Darwin, and can be called “oligophyly.” The phrase “according to their kinds” still contradicts evolutionary theory, not because species cannot change in appearance, but because it rules out monophyly, or even oligophyly.

What position should a creationist hold regarding the extent of change in species? Is it possible that species have changed a great deal since the original creation? The answer to that question must take into consideration the findings of science. But science does not yet know the answer. The problem is that morphological features result from the processes of embryological development, and the genetic basis for these processes is poorly understood. We need an organism for which embryological development has been studied for a long time. Enter the sea urchin.

The sea urchin has been a model organism for the study of embryological development for more than a century. Sea urchins have several features that make them useful for studying development. They produce millions of eggs which are transparent and easy to modify genetically. After about 48 hours of development, the sea urchin embryo reaches the late gastrula stage, with about 800 cells and 10 to 15 cell types. By the end of the third day, the embryo develops into a relatively simple larva called a pluteus. Study of the sea urchin has revealed a great deal about development, although much remains to be discovered.

The genome of the California sea urchin, *Strongylocentrotus purpuratus*, has recently been sequenced, opening up new possibilities for understanding the genetic basis for development in these creatures, and possibly helping understand development in other kinds of organisms.

Although the sea urchin still retains many secrets of the genetic basis of its development, what is known is remarkable. The sea urchin has about 23,000 genes, which is similar to the number of genes reported from humans. More than half these genes, some 12,000, are utilized in the first two days of development. This is all the more astonishing when one realizes that most of the cells from the two-day embryo are discarded when the pluteus larva metamorphoses into the familiar adult form of the sea urchin. This observation suggests that many of the genes are utilized for different functions in the larva and in the adult. If so, it might be very difficult to make drastic changes in sea urchin morphology, because changes that might be tolerated by the pluteus might be lethal to the adult.

Scientists appear to be on the way to discovering the morphological effects of genetic changes. At this point, the outcome is not known. But suppose that it were to be discovered that a few key genetic changes, say twenty, could transform a sea urchin into a starfish or a sea cucumber. Would this disprove creation? Or, suppose scientists uncovered the developmental genetics of mammals and discovered that only a few genetic changes, say ten, could transform a camel into a deer, or a dog into a cat. How would creationists respond? Might the Creator have used a genetic template, and added different details in different lineages? If so, the results might resemble, in many respects, the expectations of evolutionary theory.

On the other hand, suppose scientists discovered that development depends on such exquisite interaction among genes that there is very little room for change. Suppose it is found that there is no way an organism could survive a major change in the anatomical plan of its body, and that variation is limited to relatively minor modifications such as changes in linear dimensions. Would this disprove evolution, and how would evolutionists respond?

If history is a reliable guide, it is likely that the study of development will reveal increasing layers of complexity rather than a simple and clear-cut answer to the questions raised here. Nevertheless, it may be useful to recognize the limitations of our knowledge, even as we seek to increase our understanding of development and the potential limits to change in species. In the end, we should obtain a better understanding of the potential for morphological change among members of a lineage, and improve on our ability to estimate the number and identity of the numerous separately created lineages we often refer to as the “Genesis kinds.”

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ENDNOTE

1. Kidner D. 1967. *Genesis: An introduction and commentary*. Downer’s Grove, IL: InterVarsity Press, p 48.