

## **A positive transition from mythology-based to reality-based outlooks**

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All cultures create myths about things they lack the tools to understand, but usually replace them as understanding increases.

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Humans wherever they live are curious and want explanations. If you look at pre-literate societies almost anywhere, be it South America, Australia, arctic Canada, etc., you will find that they are or were excellent ‘practical’ naturalists – they could name most animals and plants, knew where they lived, and understood quite a lot about their ecology, behavior and so on. They had to be right about these things to survive, and they got it right by generations of careful observation and by seeing results of simple tests – this rat always bites, that one never does. When ethno-biologists investigate and compare the practical taxonomic knowledge of two or more cultures from the same general area (but with different languages and little or no friendly contact), they quite generally discover that each society divides living things up in the same ways and knows the same sorts of details about them. In other words, people can come to share a reality-based understanding of things.

However, if you step back a bit and inquire about meteors, or the moon, or earthquakes, the picture changes abruptly. Different societies saw the same stars, but they explained their origins and behaviors in radically different ways. We call these explanations myths, stories that seek to describe how and why something exists and behaves as it does, but which are unique to every culture. The basic reason that myths differ is that people did not have ways to interact with the objects or events, or to test one idea versus another, and thus they developed a wide range of idiosyncratic explanations. As people acquired the technology to make more specific observations, predictions and tests, myths tended to fall away in favor of a single, shared explanation. Few now dispute that meteors are bits of space debris traveling at such high speeds that increasing atmospheric friction causes

them to burn up. Likewise, not many people still ascribe earthquakes to angry subterranean turtles, restless giant catfish, or eight weary elephants.

Science is about applying new ideas and new tools stepwise. As a result, there is a reduction in the overall quota of mythology, whether it is about the nature of subatomic particles or of galactic clusters, or anything in between. When Darwin proposed natural selection as a mechanism for evolution he knew nothing of DNA or chromosomes, or even of the basic principles of genetics. Mendel published his discoveries about genetics less than 3 years after Darwin's *Origin*, but no one else understood what they meant for another 40 years. Darwin believed that the Earth was very old, but Lord Kelvin soon calculated (in ignorance of heat from radioactive decay) that an initially molten planet would cool to present temperatures in only 20-40 million years. The fossil record was very incompletely known in Darwin's time, and there were still large parts of the Earth whose living species had not been sampled in any detail. These and similar gaps and misunderstandings are an integral part of the scientific process, which operates by successive approximation to achieve the best fit among pieces of the puzzle. No one thinks we are finished; for example, we still cannot frame a comprehensive model about how changes in gene regulation during development can result in the observed diversity of body plans among animal groups, and thus our understanding of macroevolution must be seen as incomplete, in a state similar to concepts about mountain-building prior to the advent of plate tectonics.

As uncertainties in all these areas are resolved, a universally-shared set of reality-based explanations has gradually replaced mythology – we know what genes are and how they work, that the Earth is about 4.6 billion years old and remains molten inside due to the heat of decay of radioactive elements, that the fossil record describes an unfolding but distinctly punctuated history of life, and so on. We no longer believe that damp night air causes cholera, that moldy grain transforms into mice, or that magic phrases can turn lead into gold. We understand why antibiotics work, and also how some bacteria evolve resistance to them. Since Darwin's time we have learned a great many principles and details without finding any fatal flaws in his analysis – evolution is a reality in nature,

and natural selection is a dominant (if not the only) way by which evolutionary changes occur.

In contrast, creationism is a persisting myth peculiar to some sects of Christianity (and every other major religion has a different, parallel myth). This old story has been laid aside in favor of reality-based understanding in physics, chemistry, geology and astronomy, and in all of biology as well. Intelligent Design is simply creationism deliberately (and cynically) stripped of direct references to the Christian god in an effort to slip past laws that require separation of religious from secular content in public education.

Neither creationism nor intelligent design has any business in secular education outside of classes in mythology or comparative religion. People who wish to retain this medieval myth about the origins and operation of the natural world should at least be consistent by rejecting all other reality-based outlooks, goods and services that conflict with the literal creationist view – this means no medicine, no technology more complicated than fire, pointed sticks and hollering across the valley, and so forth. It is especially surprising when people who appreciate nature espouse creationist views – an evolutionary outlook makes biodiversity, behavior, ecology and so forth so much more interesting and logically consistent.

Creationist (and ID) explanations in biology are exactly equivalent to believing that a great warrior-hero in the east brings us sunlight by shooting his burning arrow over the land every day. They are myths persisting in conspicuous contradiction to the expanding universe of reality-based, testable explanations about the natural world.