

# Grasping the Depth of Time as a First Step in Understanding Evolution

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Published: August 23, 2005

Last month a team of paleontologists announced that it had found several fossilized dinosaur embryos that were 190 million years old - some 90 million years older than any dinosaur embryos found so far. Those kinds of numbers are always a little daunting. Ever since I was a boy in a public elementary school in Iowa, I've been learning to face the eons and eons that are embedded in the universe around us.

I know the numbers as they stand at present, and I know what they mean, in a roughly comparative way. The universe is perhaps 14 billion years old. Earth is some 4.5 billion years old. The oldest hominid fossils are between 6 million and 7 million years old. The oldest distinctly modern human fossils are about 160,000 years old.

The truth of these numbers has the same effect on me as watching the night sky in the high desert. It fills me with a sense of nonspecific immensity. I don't think I'm alone in this.

One of the most powerful limits to the human imagination is our inability to grasp, in a truly intuitive way, the depths of terrestrial and cosmological time. That inability is hardly surprising because our own lives are so very short in comparison. It's hard enough to come to terms with the brief scale of human history. But the difficulty of comprehending what time is on an evolutionary scale, I think, is a major impediment to understanding evolution.

It's been approximately 3.5 billion years since primeval life first originated on this planet. That is not an unimaginable number in itself, if you're thinking of simple, discrete units like dollars or grains of sand. But 3.5 billion years of biological history is different. All those years have really passed, moment by moment, one by one.

They encompass an actual, already lived reality, encompassing all the lives of all the organisms that have come and gone in that time. That expanse of time defines the realm of biological possibility in which life in its extraordinary diversity has evolved. It is time that has allowed the making of us.

The idea of such quantities of time is extremely new. Humans began to understand the true scale of geological time in the early 19th century. The probable depth of cosmological time and the extent of the history of the human species have come to light only within our own lifetimes.

That is a lot to absorb and, not surprisingly, many people refuse to absorb it. Nearly every attack on evolution - whether it is called intelligent design or plain creationism, synonyms for the same faith-based rejection of evolution - ultimately requires a foreshortening of cosmological, geological and biological time.

Humans feel much more content imagining a world of more human proportions, with a shorter time scale and a simple narrative sense of cause and effect. But what we prefer to believe makes no difference. The fact that life on Earth has arrived at a point where it is possible for humans to have beliefs is due to the steady ticking away of eons and the trial and error of natural selection.

Evolution is a robust theory, in the scientific sense, that has been tested and confirmed again and again. Intelligent design is not a theory at all, as scientists understand the word, but a well-financed political and religious campaign to muddy science. Its basic proposition - the intervention of a designer, a k a God - cannot be tested. It has no evidence to offer, and its assumptions that humans were divinely created are the same as its conclusions. Its objections to evolution are based on syllogistic reasoning and a highly selective treatment of the physical evidence.

Accepting the fact of evolution does not necessarily mean discarding a personal faith in God. But accepting intelligent design means discarding science. Much has been made of a 2004 poll showing that some 45 percent of Americans believe that the Earth - and humans with it - was created as described in the book of Genesis, and within

the past 10,000 years. This isn't a triumph of faith. It's a failure of education.

The purpose of the campaign for intelligent design is to deepen that failure. To present the arguments of intelligent design as part of a debate over evolution is nonsense. From the scientific perspective, there is no debate. But even the illusion of a debate is a sorry victory for antievolutionists, a public relations victory based, as so many have been in recent years, on ignorance and obfuscation.

The essential, but often well-disguised, purpose of intelligent design, is to preserve the myth of a separate, divine creation for humans in the belief that only that can explain who we are. But there is a destructive hubris, a fearful arrogance, in that myth. It sets us apart from nature, except to dominate it. It misses both the grace and the moral depth of knowing that humans have only the same stake, the same right, in the Earth as every other creature that has ever lived here. There is a righteousness - a responsibility - in the deep, ancestral origins we share with all of life.