

# Re: Time without end: Physics and Biology in an Open Universe

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**From:** Michael Ragland (*ragland66\_at\_webtv.net*)

**Date:** 10/26/04

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Michael Ragland wrote:

P.S. I thought I was alone in my belief intelligent life could modify the physical laws of the universe for its own purposes. Many may strongly disagree with Freeman Dyson but I don't think anybody would justifiably consider him a crackpot.

I don't understand this comment. Maybe I missed something skimming through Dyson's article, but at the beginning he says "Two assumptions underlie the discussion. (1) The laws of physics do not change with time. (2) The relevant laws of physics are already known to us." To me, that seems inconsistent with life modifying the laws.

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Michael Ragland:

Yeah, you have to basically read the whole thing through in context. I didn't understand the equations so I skipped those but I already knew from a comment by Hawking (which he appeared to agree with theoretically) regarding Dyson's theory that life is infinite in the universe.

One part of the article by Dyson states, "Weinberg has here, perhaps unintentionally, identified a real problem. It is impossible to calculate in detail the long-range future of the universe without including the effects of life and intelligence. It is impossible to calculate the capabilities of life and intelligence without touching, at least peripherally, philosophical questions. If we are to examine how intelligent life may be able to guide the physical development of the universe for its own purposes, we cannot altogether avoid considering what the values and purposes of intelligent life may be. But as soon as we mention the words value and purpose, we run into one of the most firmly entrenched taboos of twentieth-century science. Hear the voice of Jacques Monod (1970), high priest of scientific rationality, in his book *Chance and Necessity*:"

"Any mingling of knowledge with values is unlawful, forbidden."

Monod was one of the seminal minds in the flowering of molecular biology in this century. It takes some courage to defy his anathema. But I will

defy him, and encourage others to do so. The taboo against mixing knowledge with values arose during the nineteenth century out of the great battle between the evolutionary biologists led by Thomas Huxley and the churchmen led by Bishop Wilberforce. Huxley won the battle, but a hundred years later Monod and Weinberg were still fighting Bishop Wilberforce's ghost. Physicists today have no reason to be afraid of Wilberforce's ghost. If our analysis of the long-range future leads us to raise questions related to the ultimate meaning and purpose of life, then let us examine these questions boldly and without embarrassment. If our answers to these questions are naive and preliminary, so much the better for the continued vitality of our science.

I propose in these lectures to explore the future as Weinberg in his book explored the past. My arguments will be rough and simple but always quantitative. The aim is to establish numerical bounds within which the destiny of the universe must lie. I shall make no further apology for mixing philosophical speculations with mathematical equations."

Here's Dyson's conclusion in his paper:

"In conclusion, I would like to emphasize that I have not given any definitive proof of my statement that communication of an infinite quantity of information at a finite cost in energy is possible. To give a definitive proof, I would have to design in detail a transmitter and a receiver and demonstrate that they can do what I claim. I have not even tried to design the hardware for my communications system. All I have done is to show that a system performing according to my specifications is not in obvious contradiction with the known laws of physics and information theory.

The universe that I have explored in a preliminary way in these lectures is very different from the universe which Steven Weinberg had in mind when he said, "The more the universe seems comprehensible, the more it also seems pointless." I have found a universe growing without limit in richness and complexity, a universe of life surviving forever and making itself known to its neighbors across unimaginable gulfs of space and time. Is Weinberg's universe or mine closer to the truth?

One day, before long, we should know.

Whether the details of my calculations turn out to be correct or not, I think I have shown that there are good scientific reasons for taking seriously the possibility that life and intelligence can succeed in molding this universe of ours to their own purposes. As Haldane (1924) the biologist wrote fifty years ago, "The human intellect is feeble, and there are times when it does not assert the infinity of its claims. But even then:

Though in black jest it bows and nods,  
I know it is roaring at the gods,  
Waiting the last eclipse."

If you want to take a crack at Dyson's calculations go ahead but I won't be able to answer because I'm not a physicist.

"It's uncertain whether intelligence has any long term survival value.

Bacteria do quite well without it."

Stephen Hawking