

Parallel Thinking Part 18: The Multiverse

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As we go about our daily business, it is unlikely that we spend too much time contemplating the seemingly minute probability of our very existence. Although our Universe and the Earth we

inhabit are constructed in such a way that makes life possible, it did not have to be that way....

The Earth exists in what is known as the 'Goldilocks Zone', a specific distance away from the sun which is not too hot or too cold, but is just right for allowing the existence of life. Moreover, it is not just the temperature that is just right. Earth itself has so many necessary ingredients for life; there is liquid water; it is a solid planet with a protective atmosphere; the large moon ensures climatic stability by moderating changes in the Earth's tilt; it has a solid inner iron core and a liquid outer core which produce the Earth's magnetic field, which in turn helps to protect us from deadly solar radiation. We also have some helpful neighbours; large planets such as Jupiter help shield the Earth from asteroids.

Furthermore, the Astronomer Royal, Lord Martin Rees published a book in 1999 called '*Just Six Numbers*'. He lists six constant and fundamental physical factors. The value of each factor is utterly decisive in determining the way our Universe operates.

Lord Rees' point is that if even just one of these constants was modified by the tiniest amount, the Universe would cease to exist in its current state and would become totally sterile. The fine tuning of these constants suggests that the Universe was not the result of a random occurrence, but was designed in such a way that supports the formation of life.

Lord Rees cites a metaphor given from the Canadian philosopher, John A. Leslie: "Suppose you are facing a firing squad. Fifty marksmen take aim, but they all miss. If they hadn't all missed, you wouldn't have survived to ponder the matter. But you wouldn't just leave it at that - you'd still be baffled, and would seek some further reason for your good fortune".

This good fortune is known as the Anthropic principle, or colloquially as the 'Goldilocks Paradox'. The English clergyman William Paley (d. 1805) popularised a similar argument (known as the Teleological Argument) with his well-known analogy that just as the complex design of a watch implies a watchmaker who designed it, so too the complex nature of the Universe implies a Designer who created it.

Lord Rees acknowledges that some might conclude from the Goldilocks Paradox that only a Divine Creator could have designed these constants to support the existence of life. This is essentially a modern reworking of Paley's idea.

Yet Lord Rees proposes another, scientific explanation. Suppose that our Universe is merely one of billions, trillions or perhaps even an infinite number of universes that exist, and all of them contain different laws of physics. Our Universe happens to be the one that supports life. This 'multiverse' is a popular answer to the Goldilocks Paradox, but in next week's article we will explore its veracity and its implication.

