

Study guide

McGrath Alister E. "Lecture 3: the Mystery of the Constants of Nature." The 2009 Gifford Lectures, January 28, 2009, 1–18.

The more I examine the universe and study the details of its architecture, the more evidence I find that the universe in some sense must have known that we were coming.

—Freeman Dyson

1. What is counterfactual thinking? What role does it play in historical studies? What role might it play in scientific thinking? In particular, what role might it play in considering the "fine tuning" of the fundamental cosmological constants (strong, weak, electromagnetic and gravitational)? And why does McGrath argue that this has theological significance?
2. What is the "big bang" theory, and why did it receive widespread support by many scientists? What was one of the rival theories? According to this cosmic narrative, what factors determined the shape and outcome of the big-bang?
3. What is the "anthropic principle"? Who coined the term, and what is the difference between the *weak* and *strong* versions of this principle? What book popularized the use of the anthropic principle for apologetic purposes?
4. Which is debated: *whether* there is an observed fine-tuning of the cosmological constants or *how to interpret* the observed fine-tuning?
5. In what sense does fine-tuning impact many accounts of biological and chemical evolution? For instance, how did Fred Hoyle react to the discovery of a well-placed energy levels in carbon and oxygen?
6. What does McGrath mean when he says that "the observation of the natural world furnishes conceptual resonance with, not deductive proof of, the Christian vision of God"?
7. What other explanations have been offered of the observed anthropic phenomena? For example, what is meant when it is claimed that anthropic thinking is merely an *observational selection effect*? And why have Steven Weinberg and Leonard Susskind endorsed the *multiverse* hypothesis?