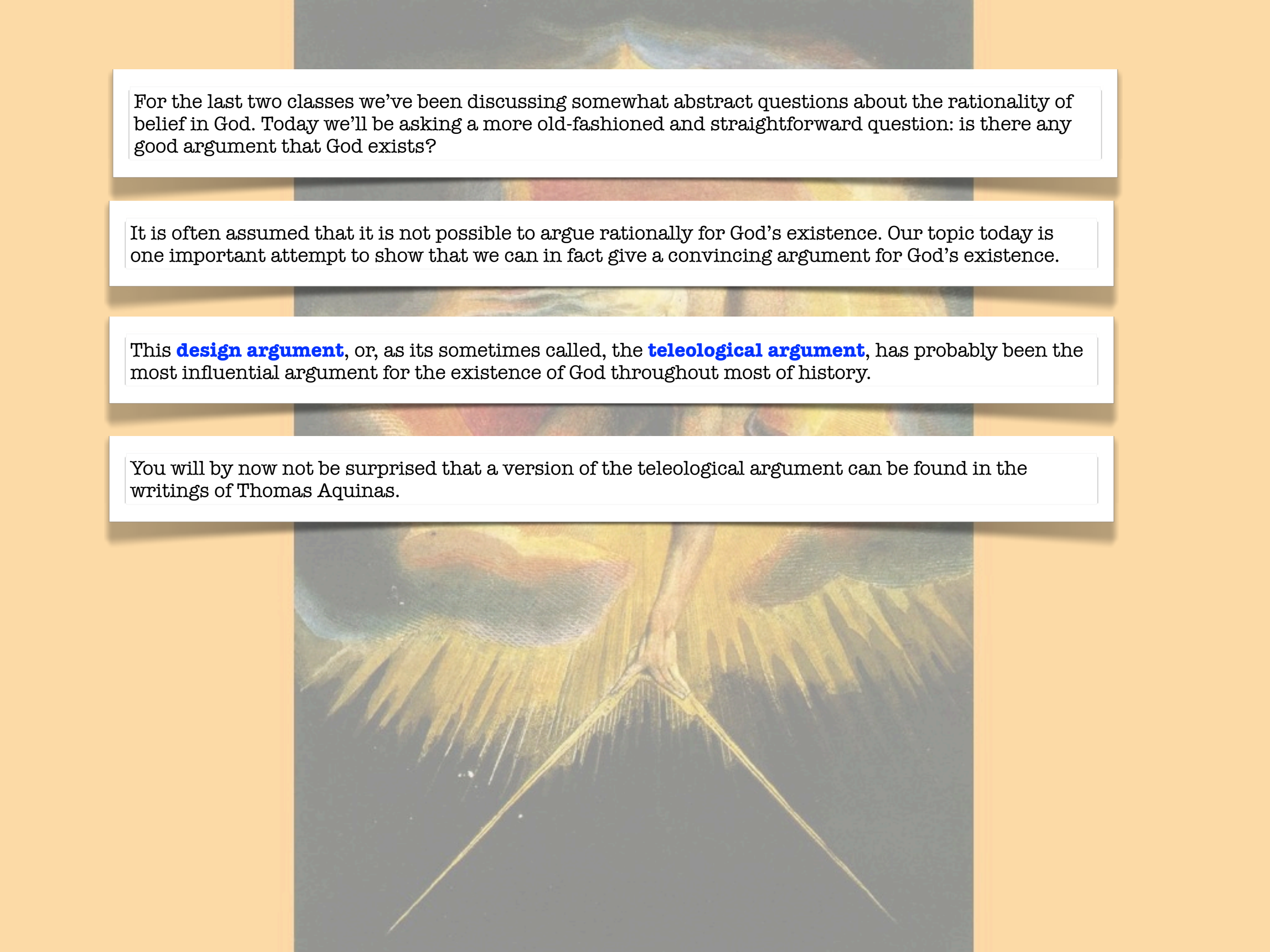




God and fine-tuning



A background painting showing a close-up of a hand holding a compass, with a large, bright, golden sunburst or starburst effect emanating from the point of the compass. The background is a dark, muted color, possibly grey or blue, with some lighter, textured areas. The overall style is somewhat abstract and dramatic.

For the last two classes we've been discussing somewhat abstract questions about the rationality of belief in God. Today we'll be asking a more old-fashioned and straightforward question: is there any good argument that God exists?

It is often assumed that it is not possible to argue rationally for God's existence. Our topic today is one important attempt to show that we can in fact give a convincing argument for God's existence.

This **design argument**, or, as its sometimes called, the **teleological argument**, has probably been the most influential argument for the existence of God throughout most of history.

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The fifth way is taken from the governance of the world. We see that things which lack knowledge, such as natural bodies, act for an end, and this is evident from their acting always, or nearly always, in the same way, so as to obtain the best result. Hence it is plain that they achieve their end, not fortuitously, but designedly. Now whatever lacks knowledge cannot move towards an end, unless it be directed by some being endowed with knowledge and intelligence; as the arrow is directed by the archer. Therefore some intelligent being exists by whom all natural things are directed to their end; and this being we call God.

Aquinas is noting that things we observe in nature, like plants and animals, typically act in ways which are advantageous to themselves. Think, for example, of the way that many plants grow in the direction of light.

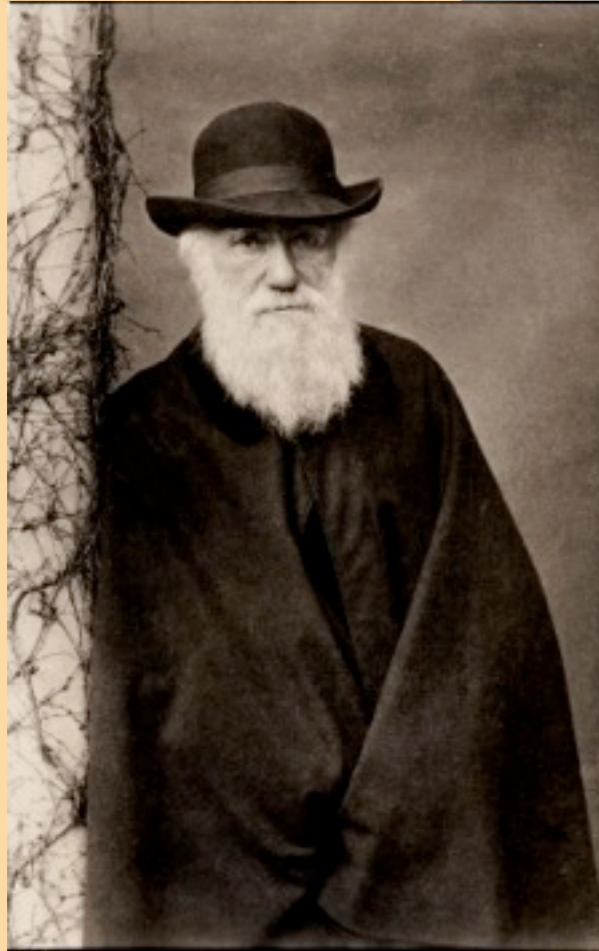
Clearly, as Aquinas says, plants don't do this because they **know** where the light is; as he says, they "lack knowledge." But then how do they manage this? What does explain the fact that plants grow in the direction of light, if not knowledge?

Aquinas' answer to this question is that they must be "directed to their end" - i.e., designed to be such as to grow toward the light - by something which does have knowledge of their ends. And what could this "something" be other than God?

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The problem for this argument came not from a philosopher finding a flaw in Paley's argument, but rather from Darwin's development of the theory of evolution. This theory shows how we might explain the 'behavior' of plants without taking it to have been designed by a creator – but also not regarding it simply as inexplicable.

Darwin himself was well aware of this consequence of his theory:

"The old argument of design in nature ... which formerly seemed to me so conclusive, fails, now that the law of natural selection had been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings and in the action of natural selection, than in the course which the wind blows. Everything in nature is the result of fixed laws."

Often very bold claims are made on behalf of the theory of evolution; sometimes it is even claimed that the theory shows that God does not exist. It is hard to see why this should be so. But it does seem that the theory undermines one historically important argument for the existence of God.

The theory of evolution does not, however, destroy every version of the design argument, since not all versions of the design argument are based on the explanation of the features of living things.

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One might think of Darwin's theory as posing a challenge to the defender of the design argument: which aspects of the universe are not explained by the theory of evolution by natural selection, and yet are such that they are better explained by God than by chance?

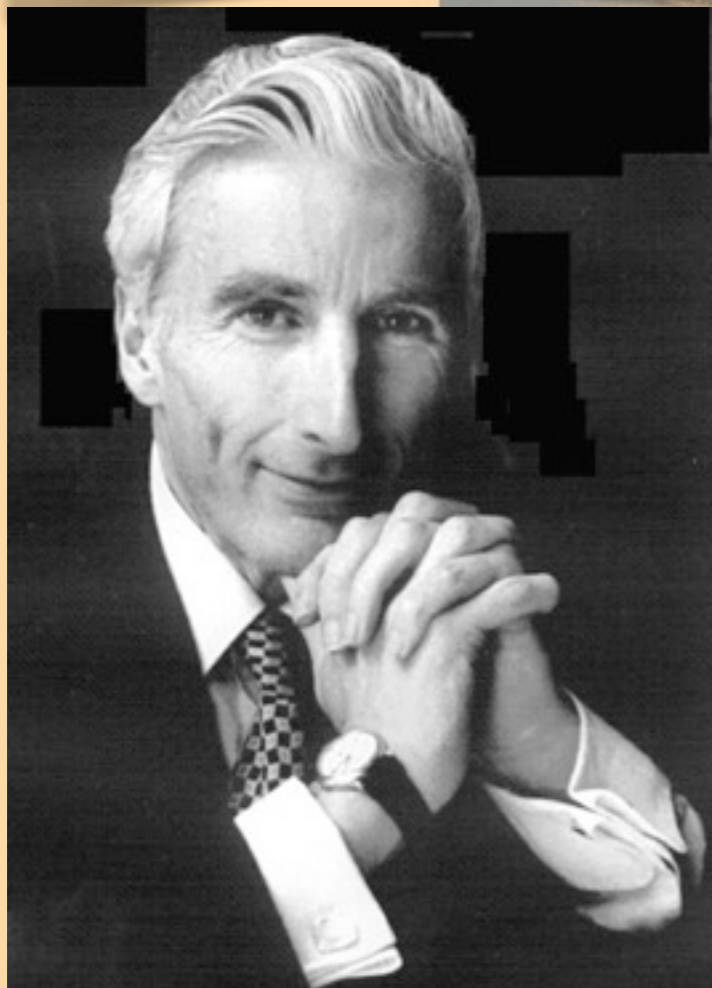
Contemporary physics suggests an answer to this question, which is illustrated by today's short excerpt from the book Just Six Numbers, by Martin Rees, a well-known astrophysicist and cosmologist.

Rees describes six constants which figure in the fundamental laws of nature, and to a large extent shape the nature of the universe. Here is one of them:

The cosmos is so vast because there is one crucially important huge number  $N$  in nature, equal to 1,000,000,000,000,000,000,000,000,000. This number measures the strength of the electrical forces that hold atoms together, divided by the force of gravity between them. If  $N$  had a few less zeros, only a short-lived miniature universe could exist: no creatures could grow larger than insects, and there would be no time for biological evolution.

And here's what Rees says about the six numbers:

These six numbers constitute a 'recipe' for a universe. Moreover, the outcome is sensitive to their values: if any one of them were to be 'untuned', there would be no stars and no life. Is this tuning just a brute fact, a coincidence?





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These remarks can be turned into an argument for the existence of God. (Though, as we'll see, it is not an argument that Rees himself accepts.) To see how this argument works, we will have to think a bit about what sorts of evidence can confirm a theory.

Consider the following two theories:

T1: It rained last night.

T2: It did not rain last night.

Suppose that I am considering these two theories this morning as I walk out of my front door, and, as I walk out the door, I come across a bit of evidence which might help me decide which of T1 and T2 are true:

E: My sidewalk is wet.

Does E count in favor of T1 or T2? Why?

One natural answer is that E counts in favor of T1 because of the following fact: **if T1 is true, then E is quite likely to be true, whereas if T2 is true, E is quite unlikely to be true.**

This suggests the following **principle of confirmation**:

Evidence E favors T1 over T2 if E would be more likely to be true if T1 is true than if T2 is true.

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Using the language of probability, this can be put as follows. To talk about the likelihood of an event happening is to talk about its **probability**, which can be represented as a number between 0 and 1.

We can also talk about **conditional probability**, which is the likelihood of something to happen in the condition that something else happens. When we want to talk about the likelihood of X happening if Y happens, we talk about **the probability of X given Y**.

In these terms, we can state the principle of confirmation as follows:

### **The principle of confirmation**

E is evidence for T1 over T2 if the probability of E given T1 > the probability of E given T2.

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This principle suggests the following further claim: if E is extremely likely to be true if T1 is true, and extremely likely to be false if T2 is true, then if E is true, this is very strong evidence that T1 rather than T2 is true.

Now consider the following piece of evidence which we seem to possess:

LIFE: The universe is such as to permit life to exist.

And now consider the following two theories about the universe:

CREATION: The universe was designed by a creator who wanted life to exist.

CHANCE: The basic physical constants of the universe are due to chance, rather than intelligent design.

The probability of LIFE given CREATION -- the chance of LIFE being true if CREATION is true -- is extremely high. This seems hard to dispute.

One of the apparent consequences of the work of Rees and others is that the probability of E given CHANCE -- the chance of LIFE being true if CHANCE is true -- is extremely low.

If this is correct, then it follows from what we have said so far that LIFE -- the fact that the universe is life-supporting -- is extremely strong evidence that CREATION, rather than CHANCE, is true.



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This is often called the **fine-tuning argument** for God's existence. It may be put as follows:

#### The fine-tuning argument

1. The probability of LIFE given CREATION is extremely high.
2. The probability of LIFE given CHANCE is extremely low.
3. The principle of confirmation.

---

C. LIFE is evidence for CREATION over CHANCE.

Above I mentioned that Rees does himself find this use of his ideas convincing; let's see why by expanding the quotation discussed above.

These six numbers constitute a 'recipe' for a universe. Moreover, the outcome is sensitive to their values: if any one of them were to be 'untuned', there would be no stars and no life. Is this tuning just a brute fact, a coincidence? Or is it the providence of a benign Creator? I take the view that it is neither. An infinity of other universes may well exist where the numbers are different. Most would be stillborn or sterile. We could only have emerged (and therefore we naturally now find ourselves) in a universe with the 'right' combination.

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Here Rees contemplates the possibility that our universe, with its laws of nature, is only one of many, many universes.

Let's suppose that this is true - that our universe is only one among many in the multiverse. Would this cast doubt on any of the premises of the fine-tuning argument?

So if we have good reason to believe in the multiverse, this has the makings of a good objection to the fine-tuning argument. But do we have good reason to believe in the multiverse?



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So if we have good reason to believe in the multiverse, this has the makings of a good objection to the fine-tuning argument. But do we have good reason to believe in the multiverse?

One might think that LIFE provides us with extremely strong evidence for the existence of the multiverse. After all, isn't the probability that a universe is life-permitting **given the existence of the multiverse** higher than if not? If so, the principle of confirmation itself seems to count strongly in favor of the multiverse.

But this argument is not convincing. Consider the following analogy:

I am sitting in my office, and I pick up 12 dice and decide to roll them. I roll all sixes. Amazed, I think to myself: there must be lots of people rolling dice in Malloy Hall right now. After all, what are the odds that someone rolls 12 sixes in Malloy in the case where there is just one person rolling dice?

Something is odd here; my rolling 12 sixes is certainly surprising, but it is not evidence for the existence of many rollers. Why not?

The explanation of what's going on here shows that we have to be careful in thinking about what, exactly, our evidence is. In particular, we need to keep the following two pieces of evidence separate:

Evidence 1: I rolled 12 sixes.

Evidence 2: Someone in Malloy Hall rolled 12 sixes.

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Evidence 1: I rolled 12 sixes.

Evidence 2: Someone in Malloy Hall rolled 12 sixes.

If my evidence is #2, **then** it looks like I have some evidence for the existence of many rollers. But in the above case my evidence is #1; and the existence of many rollers would **not** make it more likely that **I** would roll 12 sixes.

Now think about the fine-tuning argument and the multiverse. Just as in the dice case, we have to be careful to distinguish the following two pieces of evidence:

Evidence 1: This particular universe is life supporting.

Evidence 2: Some universe or other is life-supporting.

Which piece of evidence do we have? What does this show about the argument that LIFE is evidence for the existence of the multiverse?



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One might defend the above argument for the multiverse as follows:

Yes, it is true that we have piece of evidence #1 - we know that our universe is life-supporting. But we **also** have piece of evidence #2 - after all, if our universe is life supporting, it follows that **some** universe is. So if evidence #2 supports the multiverse, it looks like we have good evidence for the multiverse after all.

However, there is something odd about setting aside evidence that some particular thing is F and reasoning from the weaker claim that something or other is F. Consider the following use of this sort of reasoning, which is due to Roger White:

I wake up in the morning feeling hung over. Since I know that I am hung over, I know that someone in my house is hung over. If my house-mate drank too much last night, then this raises the probability that someone in my house will be hung over this morning; hence my being hung over provides evidence that my house-mate drank too much last night.

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To sum up our discussion of the multiverse so far: it does seem that if we have good reason to believe in the multiverse, then this is a problem for the fine-tuning argument. But so far we have not seen how we might argue for the existence of the multiverse; the idea that we can argue for this on the basis of LIFE runs into a number of problems.

Can you think of any other evidence that one might give for the multiverse?

There is one other line of objection to the fine-tuning argument worth considering.



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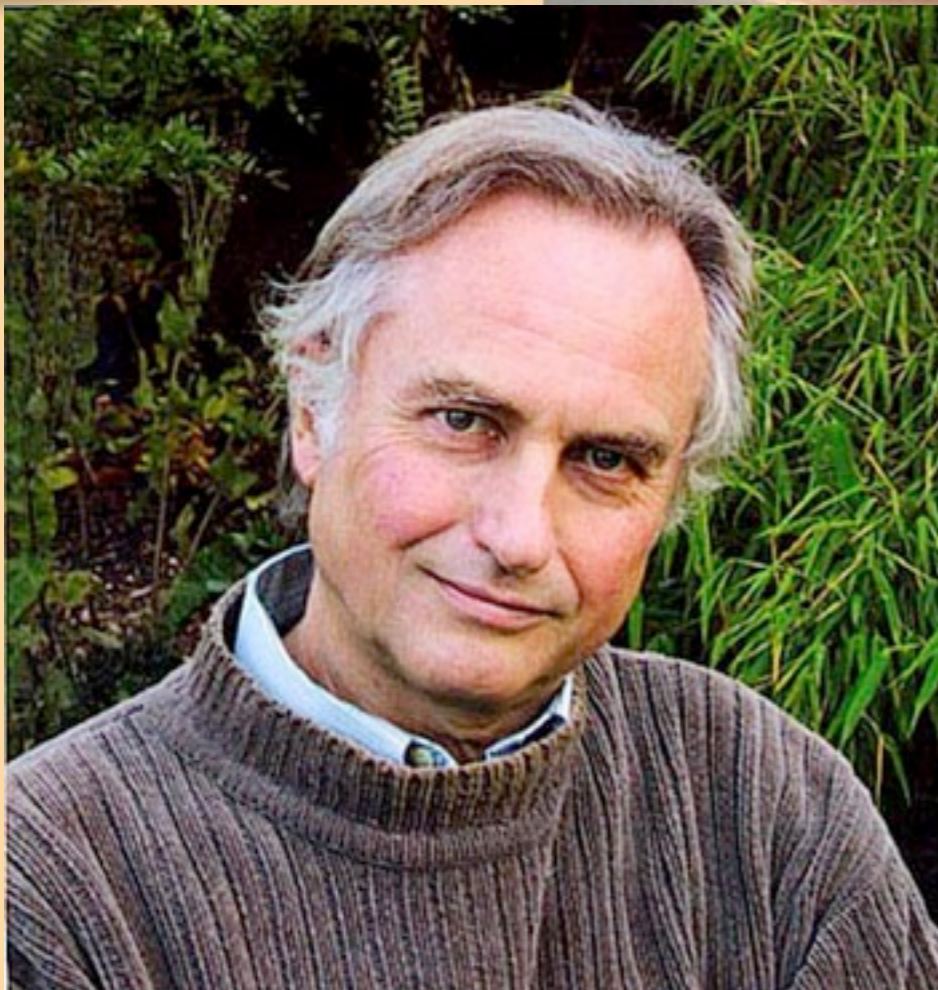
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This objection has been defended by, among others, Richard Dawkins in his book The God Delusion.



“The theist says that God, when setting up the universe, tuned the fundamental constants of the universe so that each one lay in its Goldilocks zone for the production of life. It is as though God had six knobs that he could twiddle, and he carefully tuned each knob to its Goldilocks value. ...

Biologists, with their raised consciousness of the power of natural selection to explain the rise of improbable things, are unlikely to be satisfied with any theory that evades the problem of improbability altogether. And the theistic response ... is an evasion of stupendous proportions. ... Let's turn, then, to the anthropic alternative. The anthropic answer, in its most general form, is that we could only be discussing the question in the kind of universe that was capable of producing us. Our existence therefore determines that the fundamental constants of physics had to be in their respective Goldilocks zones.”



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What he calls the “anthropic alternative” to explaining the universe involves the claim that our existence presupposes that the universe is life-supporting, so that, were the universe not life-supporting, we would not be around to discuss it.

He says, further, that our existence therefore **determines** the nature of the fundamental constants of physics.

Dawkins is presumably not making the (ridiculous) claim that we somehow set the fundamental physical constants of the universe. Rather, he is saying:

**If we exist, then the fundamental physical constants had to have been such as to permit life.**

This claim is, of course, true. (If it were not correct, then the fine-tuning argument would make no sense.) But it is not easy to see how it could be relevant to the fine-tuning argument.



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Dawkins is not proposing a third alternative to CREATION and CHANCE; and he does not seem to be giving an objection to any of the premises of the fine-tuning argument.

I find it hard to see what the ‘anthropic alternative’ could be, and how it could be relevant to this sort of argument for God’s existence.

Let's suppose that both the multiverse and the anthropic objection to the fine-tuning argument fail. It is worth emphasizing that we would still not have a **proof** of the existence of God. We would have an argument that facts about the fundamental physical constants provides evidence for the theory that God exists as against the theory that God does not exist.

Because of the kind of argument it is, the argument does not, strictly speaking, show that the existence of God is even probable. What it shows, if successful, is that **whatever probability you assigned to the existence of God before encountering these facts about the fine-tuning of the universe, you should raise your probability assignment significantly.**

An analogy here might help. Suppose you observe that I begin class every day at 12:31. Now consider the theory that an alien controls my brain and that this alien desires very strongly that this particular class should begin every day at 2:01. How likely is it that class would begin every day at 12:31 if this theory is true? Does this mean that you should think that this theory is likely to be true?

What this kind of case shows is that an observation might count in favor of a certain theory, but that, because the theory was antecedently so improbable, the theory remains quite improbable, even given the observation. Some atheists might take this attitude to the fine-tuning argument: that it significantly raises the probability that God exists, but that theism is still quite improbable, all things considered. They might think this because they think that there are good arguments against the existence of God.

But despite these limitations, if the objections we discussed to this argument can be overcome, it seems plausible that the fine-tuning argument might accomplish one aim that one might have for arguments for the existence of God: it might make it rational for someone who did not previously believe that God exists to form that belief.