Does God exist?

The design argument

The different arguments from Aquinas and Leibniz we've discussed over the last few classes were arguments for the existence of God based on extremely abstract and general features of the universe, such as the fact that some things cause other things, and that there are some contingent things.

The argument we'll be discussing today is not like this. The basic idea of the argument is that if we pay close attention to the details of the universe in which we live, we'll be able to see that that universe must have been created by an intelligent designer.

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.

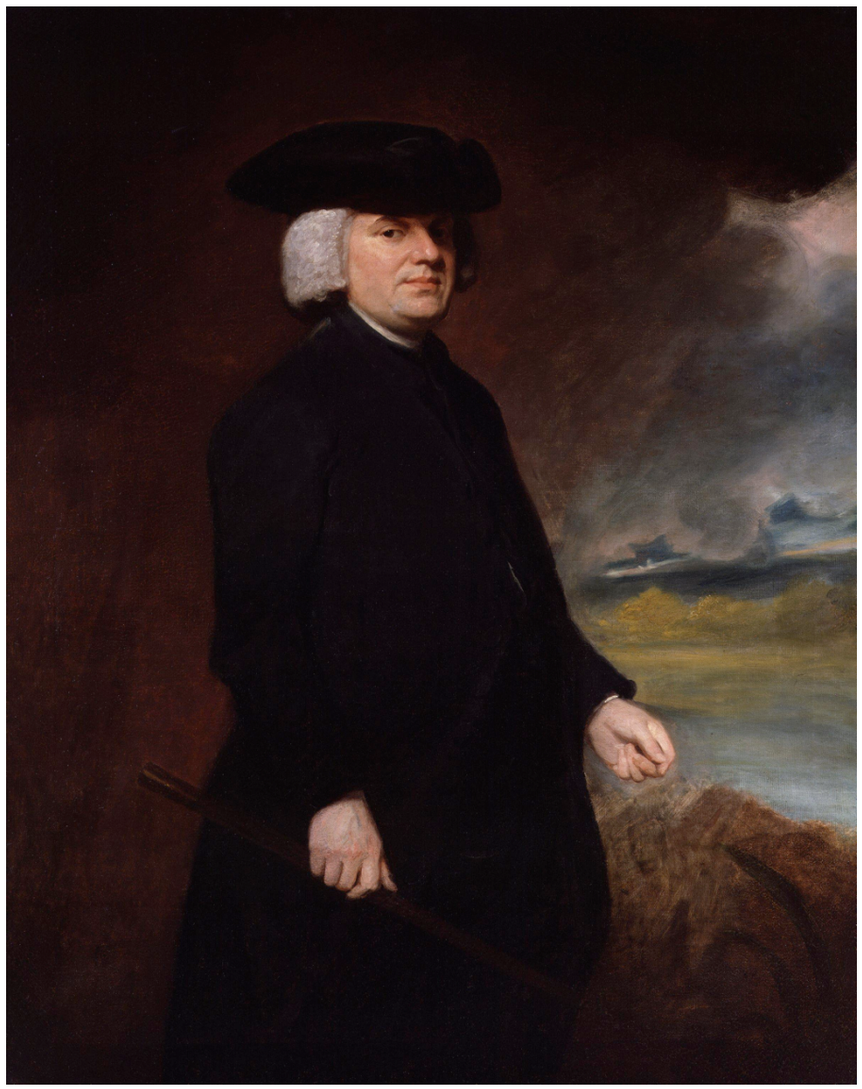
A version of the teleological argument can be found in the writings of Thomas Aquinas.

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.

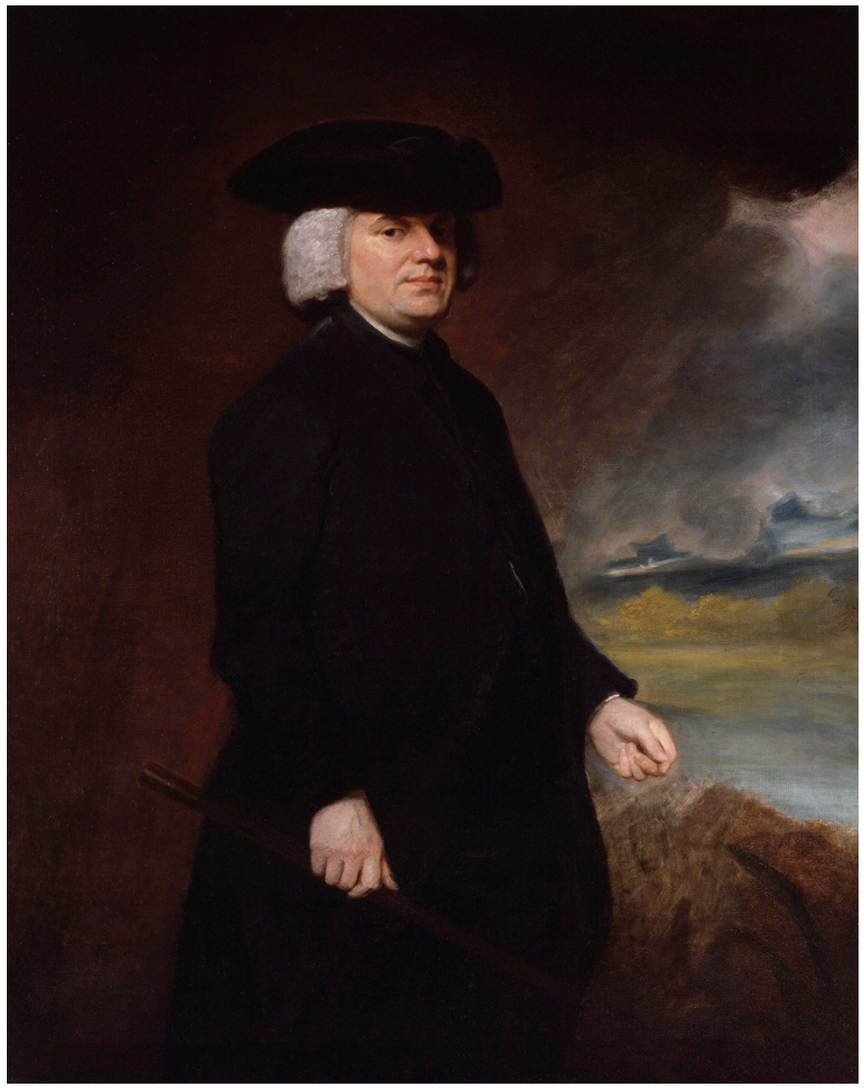
Clearly, as Aquinas says, plants don't do this because they **know** where the light is; as he says, they "lack knowledge." But then how do they manage this? What does explain the fact that plants grow in the direction of light, if not knowledge?

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 if the only alternative is that they behave randomly, this seems reasonable.



A very influential and related argument was provided by William Paley, an 18th century English philosopher and theologian, in his book *Natural Theology*.

This book is filled with careful and detailed discussions of various facets of the natural world, each of which Paley employs in his argument for the existence of an intelligent designer of the universe. A representative, and historically important, example is Paley's discussion of the eye.



"I know no better method of introducing so large a subjection than that of comparing a single thing with a single thing; an eye, for example, with a telescope. As far as the examination the instrument goes, there is precisely the same proof that the eye was made for vision, as there is that the telescope was made for assisting it. ... [the] laws require, in order to produce the same effect, that the rays of light, in passing from water into the eye, should be refracted by a more convex surface, than when it passes out of air into the eye. Accordingly we find that the eye of a fish ... is much rounder than the eye of terrestrial animals. What plainer manifestation of design can there be than this difference?"

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> “... suppose I found a watch on the ground, and it should be enquired how it happened to be in that place, I should hardly think of the answer ... that the watch had always been there. Yet why not? ... For this reason: ... when we come to inspect the watch, we perceive ... that its several parts are put together and framed for a purpose ... that if the several parts had been differently shaped from what they are ... no motion at all would have been carried on in the machine ...”

Let's say that an object has the "marks of design" if its parts are finely-tuned to serve some end, in the sense that, if the parts were different in very small ways, that would make the end impossible to achieve. Then we can represent Paley's argument as follows:

1. Many things in nature, like eyes, show the marks of design.
2. These things must either have been created by an intelligent designer or produced by random natural processes.
3. Random natural processes never, or almost never, produce things with the marks of design.

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C. Things in nature that show the marks of design are very likely to have been created by an intelligent designer. (1,2,3)

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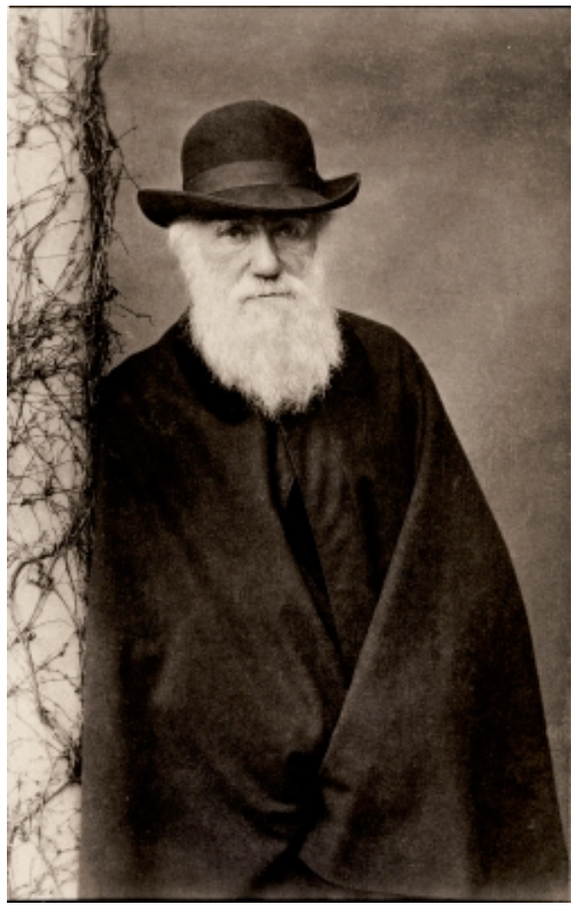
This argument for God's existence, however, faces an important challenge of which Paley could not have been aware.



This challenge 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 provides very strong reason to doubt premise 3 of Paley's argument.

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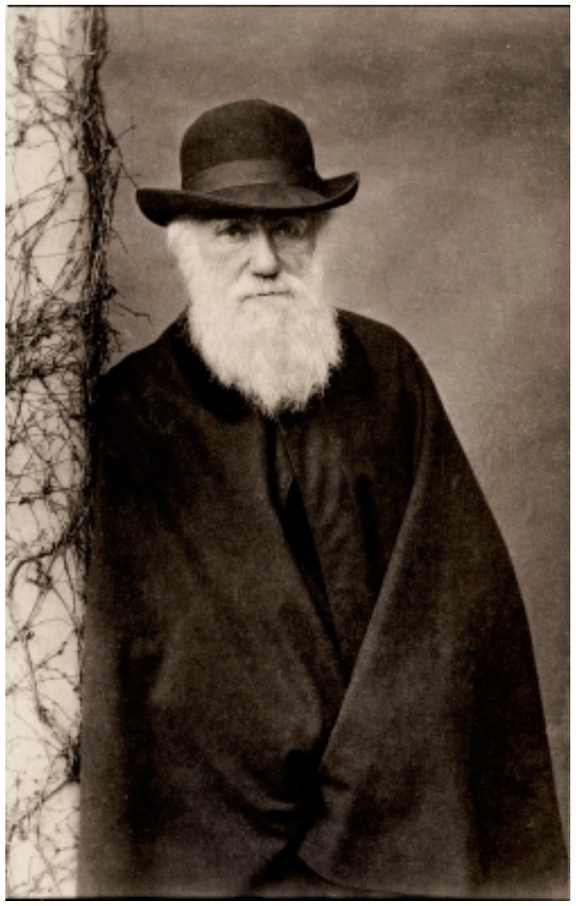

"It is scarcely possible to avoid comparing the eye with a telescope. We know that this instrument has been perfected by the long-continued efforts of the highest human intellects; and we naturally infer that the eye has ben formed by a somewhat analogous process. But may not this inference be presumptuous? Have we any right to assume that the Creator works by intellectual powers like those of man? ... In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might thus be formed as superior to one of glass, as the works of the Creator are to those of man?"

Darwin's theory shows how random natural processes could, over time, produce things with the marks of design. This theory seems to destroy Paley's argument, as Darwin himself noted in his autobiography:

> "The old argument of design in nature, as given by Paley, 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 by natural selection; 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 the theory does undermine a historically very important argument for the existence of God.

One might think of Darwin's reply to Paley 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, an 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 1,000,000,000,000,000,000,000,000,000,000,000,000. 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.

It's not hard to find other examples of the phenomenon, as Father Ernan McMullin (a former Notre Dame philosophy professor) points out:

> If the strong nuclear force were to have been as little as 2% stronger (relative to the other forces), all hydrogen would have been converted into helium. If it were 5% weaker, no helium at all would have formed and there would be nothing but hydrogen. If the weak nuclear force were a little stronger, supernovas could not occur, and heavy elements could not have formed. If it were slightly weaker, only helium might have formed. If the electromagnetic forces were stronger, all stars would be red dwarfs, and there would be no planets. If it were a little weaker, all stars would be very hot and short-lived. If the electron charge were ever so slightly different, there would be no chemistry as we know it. Carbon (^{12}C) only just managed to form in the primal nucleosynthesis

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?

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?

T1. It rained last night.

T2. It did not rain last night.

E. My sidewalk is wet.

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.**

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.**

Let's talk about a few examples of conditional probability to make it clearer what we are talking about.

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What is the probability of you passing this course, conditional on you completing every assignment well?

What is the probability of you passing this course, conditional on you skipping every class and doing none of the assignments?

What is the probability of you winning a lottery, conditional on there being 10 tickets in the lottery?

What is the probability of you winning a lottery, conditional on there being 1000 tickets in the lottery?

We can now introduce the following principle, which seems to explain our reasoning about the wet sidewalk:

The principle of confirmation

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

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 permits life to exist.

The principle of confirmation

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LIFE: The universe permits 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.

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The probability of LIFE given CREATION — the chance of LIFE being true if CREATION is true — seems to be extremely high.

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.

LIFE: The universe permits life to exist.

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.

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

1. The probability of LIFE given CREATION is extremely high.
2. The probability of LIFE given CHANCE is extremely low.
3. If the probability of E given T1 is much higher than the probability of E given T2, then E is strong evidence for T1 over T2.

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Note that the fine-tuning argument is in one important respect unlike the other arguments for God's existence we have discussed: it does not have as its conclusion the claim 'God exists.' Rather, it attempts to argue for the existence of God in a way more like the way in which one might argue on the basis of evidence for the truth of a scientific theory.

In that sense it is not really a proof of God's existence. It is an argument that one piece of evidence very strongly favors the hypothesis that God exists. It is an argument that we have the same kind of reason to believe in God's existence that we have to believe in well-supported scientific theories.

However, it should be emphasized that the evidence here, if the argument is good, seems to be very strong indeed. On some estimates the odds of the physical constants having life-permitting values by chance is on the order of $1 / 10^{100}$.

It is difficult to think about numbers this large. But to give you some idea: the odds of winning Powerball are about 1 in 300 million. Now consider the odds of winning Powerball one trillion times in a row. Call that a “super Powerball.”

Now consider the odds of winning a super Powerball one trillion times in a row. Call that a “super duper Powerball.”

Now consider the odds of winning a super duper Powerball one trillion times in a row. The odds of this happening are about $1 / 10^{44}$ — so much, much higher than the odds of the universe being life-permitting by chance.

I want to focus on one central objection to the fine-tuning argument, which may be put like this:

The anthropic objection

We could never observe the falsity of LIFE since, if it were false, we would not exist to observe it.

As it stands, this objection is a bit puzzling. It does not, by itself, seem to cast doubt on any of the premises of our argument.

One might turn it into an objection by saying that, if it is impossible for us to observe some fact, then the opposite of that fact can never be used as evidence for anything.

But if we think about some examples, we can see that this principle is not very plausible.

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Consider, for example, the following case:

The firing squad

A prisoner is standing in front of a firing squad of 10 gunmen, all of whom are excellent shots. The guns all fire at the same time and, to his surprise, the prisoner realizes that he is still alive, and without a scratch. He infers that the gunmen were not trying to kill him.

Could one object to the prisoner's reasoning by saying that, if the gunmen had shot him, he would not have been around to observe this? This does not seem very plausible; the prisoner's reasoning seems perfectly fine. But, the defender of the fine-tuning argument might say, this reasoning is just the same as our reasoning about LIFE and CREATION.

However, the anthropic objection is not so easily dismissed. Consider the following story:

The confused fisherman

A fisherman is using a net which has a 10” hole in it. So, of course, the fisherman never finds in his net any fish shorter than 10”. The fisherman concludes that, amazingly, there are no fish shorter than 10” in the lake.

Here, the fisherman’s reasoning is plainly bad. This sort of case involves what is sometimes called an observational selection effect. It is a situation in which one’s way of obtaining evidence restricts that evidence to exclude certain things. In such cases, the slogan goes, we should not take ‘absence of evidence to be evidence of absence.’

This is a little puzzling. In the firing squad case, the prisoner could not observe his being shot; in the fisherman case, the fisherman cannot observe fish smaller than 10”. So why is the prisoner’s reasoning good, and the fisherman’s reasoning bad?

Here is a plausible answer: in the case of the fisherman, there are many fish in the lake — many possible samples. Prior to the test, the fisherman has no particular reason to believe that all of the samples are bigger than 10”. Since his way of gathering evidence makes it impossible for him to observe samples less than 10”, he is wrong to conclude anything about average fish length from his observations.

In the case of the firing squad, by contrast, there is just one sample.

Is the reasoning in the fine-tuning argument more like the firing squad case, or like the fisherman case?

One might think: it is more like the firing squad case. For there is just one universe — and so nothing analogous to the many fish in the lake that slip through the fisherman's net.

But this is not universally agreed. Many defenders of the anthropic objection to the fine-tuning argument endorse the following claim:

The multiverse hypothesis
There are very many — perhaps infinitely many — distinct universes, which can have different initial conditions and different laws of nature.

Suppose that this were true. Would this make trouble for the fine-tuning argument?

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Suppose that this were true. Would this make trouble for the fine-tuning argument?

It seems that it would, because it would make the reasoning employed in that argument just like the faulty reasoning employed by our confused fisherman. If there are enough universes, it would not be surprising if some, just by chance, were life permitting.

It is also unsurprising that we find ourselves at a life-permitting one, since we could not exist at any other. (Just as it is unsurprising that our fisherman finds only 10” or bigger fish, since his net won’t hold any others.)

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We could never observe the falsity of LIFE since, if it were false, we would not exist to observe it.

The multiverse hypothesis
There are very many — perhaps infinitely many — distinct universes, which can have different initial conditions and different laws of nature.

We began by considering the anthropic objection to the fine-tuning argument. So far we've found some reason to believe the following two claims: (1) the anthropic objection by itself is not a very good objection to the fine-tuning argument; and (2) the combination of the anthropic objection and the multiverse hypothesis does seem to be a problem for that argument.

So the key question is: is the multiverse hypothesis true?

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A first point to note: it would be very surprising if this hypothesis were true. For, if it is, there are very many — perhaps infinitely many — other universes, each as real as ours, in which some near-duplicate of you exists. There is, for example, very likely one in which there exists some being with a qualitatively identical history to you who differs from you only in that she or he scratched his nose one second ago.

This does not show that the multiverse hypothesis is false; the universe might be strange, and science repeatedly shows us that it is. But it does suggest that the multiverse hypothesis is not one that we should believe without argument.

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One might think that the very facts used in the fine-tuning argument can be used to support the multiverse hypothesis. For consider the following argument:

> It is very, very improbable that our universe is the only one and, just by chance, the constants came to be set in such a way as to make life possible. But if there were many many universes, it would not be very improbable that one would be life supporting. So, the fact that our universe is life-supporting is strong evidence in favor of the multiverse hypothesis.

But, while this reasoning sounds plausible, consideration of parallel cases shows that something has gone wrong.

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But, while this reasoning sounds plausible, consideration of parallel cases shows that something has gone wrong.

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?

This would be terrible reasoning; the fact that I rolled all sixes, however improbable, is not evidence for the existence of many rollers. What has gone wrong?

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One diagnosis is that we need to distinguish between two pieces of evidence we might have:

Evidence 1: I rolled 12 sixes.

Evidence 2: Someone in Malloy Hall rolled 12 sixes.

The existence of many rollers would make Evidence 2 more likely. Would it make Evidence 1 more likely?

If not, then it looks like (given the principle of confirmation) Evidence 2, but not Evidence 1, provides evidence for the many rollers hypothesis. Since in our imagined scenario what I possess is Evidence 1, my inference that there must be many rollers was illegitimate.

But now compare this to the case of the multiverse.

Evidence 1: This universe is life-supporting.

Evidence 2: Some universe is life-supporting.

Which of these, if either, does the multiverse hypothesis make more likely? What does this show about the idea that LIFE supports the multiverse hypothesis?

Summing up: it appears that, if we have good reason to believe the multiverse hypothesis, this would be bad news for the fine-tuning argument. But it also seems that the fact that our universe is life-supporting is not itself evidence for the multiverse hypothesis. So the key remaining question is: do we have any good reason to believe in the multiverse?

This is a question very much in dispute — though the dispute is primarily among physicists rather than philosophers. Some physicists think that there is physical evidence in favor of the multiverse hypothesis. Others think that the very idea of physical evidence about universes distinct from our own makes little sense.

Here — as in the case of Paley and Darwin — we have another example in which philosophical reasoning and scientific theory are intertwined.

I want to close by considering an important limitation of the fine-tuning argument. 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 12:31. 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.

This limitation does not make the fine-tuning argument insignificant. (Remember, after all, that one many views the odds that the universe could have been life-permitting by chance are unfathomably low.) It leaves open the important possibility that the fine-tuning argument might accomplish a central aim of 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.