Debate on the Anthropic Principle or Mind First Explanations.

Mostly by Probeman (John Donovan) with help from Victor Stenger. Philosophy Forum 3/2005

Mariner wrote:
What I'm trying to show is that (2) is nonsensical. Chance requires an universe to work. Actually, chance -- as we know it -- requires *this* universe to work. This universe can't be a part of itself, so, whatever is the reason behind how the universe is, "chance" isn't it.

To insist that THIS universe is "required to work" assumes that there is only one universe. Of course, we can't know whether this is the case or not- but since this is the religion forum (or metaphysics, same thing really), we can assert pretty much anything that strikes our intuitions I guess.

Here is Victor Stenger's take on chance, the fundamental parameters and the anthropic principle:

http://www.colorado.edu/philosophy/vstenger/Cosmo/anthro.skinq.h tml

"The interpretation of the anthropic coincidences in terms of purposeful design should be recognized as yet another variant of the ancient argument from design that has appeared in many different forms over the ages. The anthropic design argument asks: how can the universe possibly have obtained the unique set of physical constants it has, so exquisitely fine-tuned for life as they are, except by purposeful design--design with life and perhaps humanity in mind?

This argument, however, has at least one fatal flaw. **It makes the wholly unwarranted assumption that only one type of life is possible --the particular form of carbon-based life we have here on earth.** Even if this is an unlikely result of chance, some form of life could still be a likely result. It is like arguing that a particular card hand is so improbable that it must have been foreordained.

Based on recent studies in the sciences of complexity and "Artificial Life" computer simulations, sufficient complexity and long life appear to be primary conditions for a universe to contain some form of reproducing, evolving structures. This can happen with a wide range of physical parameters, as has been demonstrated (Stenger 1995). The fine-tuners have no basis in current knowledge for assuming that life is impossible except for a very narrow, improbable range of parameters.

Amusingly, the new cosmic creationists contradict the traditional design argument of the biological creationists, that the universe is so uncongenial to life that life could not have evolved naturally. The new creationists now tell us that the universe is so congenial to life that the universe could not have evolved naturally.

Since all scientific explanations until now have been natural, then it would seem that the first step, before asserting purposeful design, is to seek a natural explanation for the anthropic coincidences. Such a quest would avoid the invocation of supernatural agency until it is absolutely required by the data."

If life isn't necessarily unique to our observable physical laws, then is it possible that other universes could have been created? Therefore making our universe and hence our existence, simply that, as Mariner puts it, "we got lucky". So how could the current theories explain this? Stenger continues:

"For almost two decades, the inflationary big bang has been the standard model of cosmology (Guth 1981, 1997; Linde 1987, 1990, 1994). We keep hearing, again from the unreliable popular media, that the big bang being is in trouble and the inflationary model is dead. In fact, no viable substitute has been proposed that has near the equivalent explanatory power.
The inflationary big bang offers a plausible, natural scenario for the uncaused origin and evolution of the universe, including the formation of order and structure--without the violation of any laws of physics. These laws themselves are now understood far more deeply than before, and we are beginning to grasp how they too could have come about naturally. The natural scenario I will describe here has not yet risen to the

exalted status of a scientific theory. However, the fact that it is consistent will all current knowledge and cannot be ruled out at this time, demonstrates that no rational basis exists for introducing the added hypothesis of supernatural creation. Such a hypothesis is simply not required by the data.

According to the proposed natural scenario, by means of a random quantum fluctuation the universe "tunneled" from pure vacuum ["nothing"] to what is called a false vacuum, a region of space that contains no matter or radiation but is not quite nothing. The space inside a bubble of false vacuum is curved, or warped, and a small amount of energy is stored in that curvature, like the potential energy of a strung bow. **This ostensible violation of energy conservation is allowed by the Heisenberg uncertainty principle for sufficiently small time intervals.**

The bubble then inflated exponentially and the universe grew by many orders of magnitude in a tiny fraction of a second. (For a not-too-technical discussion and original references, see Stenger 1990). As the bubble expanded, its curvature energy transformed (naturally) into matter and radiation. Inflation stopped, and the more linear big bang expansion we now experience commenced. As the universe cooled, its structure spontaneously froze out--just as formless water vapor freezes into snowflakes whose unique and complex patterns arise from a combination of symmetry and randomness.

In our universe, the first galaxies began to assemble after about a billion years, eventually evolving into stable systems where stars could live out their lives and populate the interstellar medium with the complex chemical elements such as carbon needed for the formation of life.

So how did our universe happen to be so "fine-tuned" as to produce wonderful, self-important carbon structures? As I explained above, we have no reason to assume that ours is the only possible form of life and life of some sort could have happened whatever form the universe took--however the crystals on the arm of the snowflake happened to get arranged by chance.

If we have no reason to assume ours is the only life form, we also have no reason to assume that ours is the only universe. Many universes can exist, with all possible combinations of physical laws and constants. In that case, we just happen to be in the particular one that was suited for the evolution of our form of life. "

So, in spite of our heartfelt intuitions, I don't think we can rule out "chance". It's at least consistent with what we currently observe.
By Probeman (John Donovan)

I just found an extended version of Stenger's essay here which contains considerably more physics details:

http://www.colorado.edu/philosophy/vstenger/Cosmo/anthro_philo.p df

It's interesting that a theory of many universes contains one less hypothesis than a theory of one universe. This is indeed the Copernican Principle with a vengeance!
By Probeman (John Donovan)

Mariner wrote:
Sorry probe, but your post completely skips the argument being made in this thread. I even bashed the anthropic principle, and for the same reasons that you offered. Since this is a metaphysical argument, and

not a scientific one, not all the King's scientific essays could make a dent in it. They could only (if they are scientific) address how this universe is, not how it came to be.

In effect, your entire post (including the conclusion mentioned above) is an example of your heartfelt intuitions about this issue . There isn't any counter-argument to what has been proposed, only intuitions.
A typical Mariner non-response! Shame on you!

You said "What I'm trying to show is that (2) [chance] is nonsensical." I'm responding to that. It's amusing actually. I suspect that 150 years ago you would have been giving metaphysical reasons why offering "chance" as an explanation for biological design "is nonsensical."

I would have thought you'd at least enjoy the section in the paper where he discusses how a continuum of universes could "evolve" by natural selection. Since you've already said that "evolution is chance", I thought you might enjoy a possible scientific answer to the question: **is cosmology chance?**

"THE DESCENT OF THE UNIVERSE
Smith 25 and Smolin26 have independently suggested a mechanism for the evolution of universes by natural selection. They propose a multi-universe scenario in which each universe is the residue of an exploding black hole that was previously formed in another universe. An individual universe is born with a certain set of physical parameters--its "genes." As it expands, new black holes are formed within. When these black holes eventually collapse, the genes of the parent universe get slightly scrambled by fluctuations that are expected in the state of high entropy inside a black hole. So when the descendant black hole explodes, it produces a new universe with a different set of physical parameters--similar but not exactly the same as its parent universe. (To my knowledge, no one has yet developed a sexual model for universe reproduction.)

The black hole mechanism provides for both mutations and progeny. The rest is left to survival of the survivor. Universes with parameters near their "natural" values can easily be shown to produce a small number of black holes and so have few progeny to which to pass their genes. Many will not even inflate into material universes, but quickly collapse back on themselves. Others will continue to inflate, producing nothing. However, by chance some small fraction of universes will have parameters optimized for greater black hole production. These will quickly predominate as their genes get passed from generation to generation.

The evolution of universes by natural selection provides a mechanism for explaining the anthropic coincidences that may appear far out, **but Smolin suggests several tests.** In one, he predicts that the fluctuations in the cosmic microwave background should be near the value expected if the energy fluctuation responsible for inflation in the early universe is just below the critical value for inflation to occur. He also predicts a so-far unobserved connection between black holes and carbon production in stars..It is no coincidence that the idea of the evolution of universes is akin to Darwin's theory of biological evolution. In both cases we are faced with explaining how unlikely, complex, non-equilibrium structures can form without invoking even less likely supernatural forces. Natural selection may offer a natural explanation."

So just maybe, just as Darwin replaced biological design with evolution, maybe physics will replace cosmic design with evolution. As I said, it's at least consistent with current knowledge and scientific in that these hypotheses can tested.

On the other hand, pray continue with your metaphysics of the gaps.
By Probeman (John Donovan)

Mariner wrote:
But even if this argument is flawed, there is still a question underlying it all. For it is a fact that there are

regularities, and that the gravitational constant really is fine-tuned to a certain degree. The flaw with "anthropic principle" arguments -- as probeman correctly points out -- is that it assumes that if the universe were otherwise, there would be no life (or no minds, or no planets, depending on the arguer), when the best that can be said is that there would be no X "as we know it". But what I'm talking about has nothing to do with this. The question is far simpler, and does not assume anything about how life is or should be (it doesn't address life at all). There is regularity. Where did it come from? Why is the gravitational constant X and not X + 0,000000001?

Mariner,
First you say the anthropic argument is rubbish (and I agree with you) and then you offer a position (using the gravitational ratio example) which is seemingly identical to the one made by the anthropists.

From your comment above I fail to see how you could have read the essay I linked above in which it was shown through standard physics that many different combinations of physical constants could still result in long lived universes and therefore the possibility of self-replicating entities. See Stenger's MonkeyGod program in which these parameters are randomly varied and still result in stable universes.

I'd be basing my metaphysics (if I had any) on the Copernican principle which states that humans do not occupy a special place in the universe (or multi-verse for that matter). That principle has been very fruitful for science. Why is it that humans have the need for believing themselves special- the apple of God's eye? Of course we're probably really not special in that regard- I expect all self-aware replicating entities in other universes would feel the same way.

I guess I ought to ask if you could define these "regularities" for us that you find impossible see as the possible result of randomly varying physical constants. One thing is clear- we have no idea of the actual parameter space that is possible for these "bubble" universes and little intuitive appreciation of the vast, vast amounts of time involved for something interesting (like us, for example) to occur.

Dreamweaver: you forgot about inflation in your response- better read the essay.

I find it interesting that given your three options 1. God, 2. Chance, 3. Irreducibility, you want to dismiss the chance option as 'honsensible" when it is the only one that has any possibility of being tested scientifically. That leaves God and Irreducibility, which amount to the same thing: intuitive, heartfelt, pre-Copernican, geocentric, provincial, vitalistic, metaphysics of the gaps! ;)
By Probeman (John Donovan)

Mariner wrote:
Poor Copernicus, who was probably a *priest*, now being considered as the father of your very own heartfelt intuition . Think big! Talk about the Probeman Principle instead of ascribing it to one who certainly didn't believe in it!

Twisting words again. Seems like old times! I have to say I love you Mariner. Obviously it was named AFTER him. He's certainly not remembered for being a priest. In science only the good ideas are kept (unlike metaphysics).

Mariner wrote:
I have given several examples throughout the thread. Gravitational constant. Ratio of hydrogen to oxygen in a molecule of water. Etc. There is another thing that is clear -- when you talk about bubble universes and the vast, vast amounts of time involved, you plainly didn't understand the argument... once again you're saying things with which I agree, while supposing that they somehow harm (or even touch upon) the argument at hand.

I've already pointed out that these are Anthropic arguments that are easily explained by random variation in the fundamental constants. I agree that probabilities are not neccessary when everything that can occur, must occur- eventually. So why do you say the Anthropic argument is "rubbish" and then use the same arguments?

Mariner wrote:
(Of course, you're wrong about the possibility of testing chance scientifically as the explanation behind the universe.)

Not according to Stenger and Smolin: "The evolution of universes by natural selection provides a mechanism for explaining the anthropic coincidences that may appear far out, but Smolin suggests several tests. In one, he predicts that the fluctuations in the cosmic microwave background should be near the value expected if the energy fluctuation responsible for inflation in the early universe is just below the critical value for inflation to occur. He also predicts a so-far unobserved connection between black holes and carbon production in stars..."

Even the worst scientific theory is better than the best metaphysical speculation for this reason. I see your latest post calling for intelligent design. You're a smart guy, you understand how the appearance of design can come from enough time, chance and selection in biology. Now simply apply these same concepts to cosmology.

If you're wondering where the "regularity" and random variation comes from, Stenger says:

"According to the natural scenario, by means of a random quantum fluctuation the universe tunneled from pure vacuum ["nothing"] to what is called a false vacuum, a region of space that contains no matter or radiation but is not quite nothing. The space inside this bubble of false vacuum was curved, or warped. A small amount of energy (approximately the rest energy of 20 micrograms of matter) of was contained in that curvature, somewhat like the energy stored in a strung bow. This ostensible violation of energy conservation is allowed by the Heisenberg uncertainty principle for sufficiently small time intervals.

The bubble then inflated exponentially and the universe grew by many orders of magnitude in a tiny fraction of a second. As the bubble expanded, its curvature energy was converted into matter and radiation, inflation slowed to a stop by a kind of friction (this all follows from the equations 22), and the more linear big bang expansion we now experience commenced. The universe cooled and its structure spontaneously froze out, as formless water vapor freezes into snowflakes whose unique patterns arise from a combination of symmetry and randomness."
By Probeman (John Donovan)

Mariner wrote:
What a word-twister I am. "The Copernican principle", and I assume that it is a principle of Copernicus. Wicked, wicked Mariner .

No, not wicked. Probably a very nice well meaning guy that like myself sometimes jumps to conclusions because he didn't follow the link to read the essay which explains the principle.

Mariner wrote:
... such as?

Gravitational constant. Ratio of hydrogen to oxygen in a molecule of water. Etc.

Mariner wrote:
Even the best scientific theory would do well to ponder about the meaning of the word "universe" before trying to explain it. Stenger and Smolin should do that.

I'll be sure to tell Victor next time I see him. But yes, "multiverse" is a better description since a single universe requires an additional hypothesis.

Mariner wrote:
Of the universe, probeman. Take a breath and read it carefully. I'm not talking about "intelligent design" as in Behe and Co.

Oh, I understand. This is a mind first "explanation". No infinite regress there.

Mariner wrote:
Lovely speculation. I wish them luck. Perhaps they can establish all that. And guess what? This won't matter for the argument at hand. They will just have added one step in the infinite regress that is looming.

No, you missed the whole point. The random variation in fundamental constants prior to inflation PRODUCES the "regularity" we observe. No infinite regress- just chance and a lot of time...
By Probeman (John Donovan)

Mariner wrote:
Fine. Suppose this has been established. Now how did this random variation come into being? It can't exist in a vacuum. "Random variation" presupposes many starting conditions, which is what I'm asking about.

The random variation is due to uncertainty. Well maybe you should read the link.

http://www.colorado.edu/philosophy/vstenger/Cosmo/anthro_philo.p df
By Probeman (John Donovan)

Mariner wrote:
I will read it, if you promise to explain me what this sentence of yours may *possibly* mean. I think you wrote too hastily. "Uncertainty" is either random variation itself (in common parlance) or -- as I suspect you mean -- related to the quantum principle of uncertainty. And as such, of course, it is a very *certain* principle . It is but one of the regularities, or starting conditions, of which I'm talking about.

I will explain, if you will agree to read the link. Otherwise I'm afraid you will simply not know what I'm talking about and once again brush it aside with the comment "no science essay can touch this question"- as though science hasn't already "touched on" many formally metaphysical problems and is likely to continue with the tradition!

I seem to recall reading, that when biological evolution was first proposed 150 years ago, metaphysical and religious arguments against "natural" explanations for the appearance of biological design invoking randomness and chance were also offered (how can complexity naturally arise from non-complexity?). Now the explanatory gap has been pushed back to 10^-42 seconds. The gap will always be there, but it gets smaller all the time.

Mariner wrote:
My question is the second. Given that there are constants, why are they of one value and not of another?

If it sounds like the anthropic argument, smells like the anthropic argument and tastes like the anthropic argument, then it must be the anthropic argument! I have answered this question in previous posts, but it is answered in greater detail in the essay so read and enjoy.
By Probeman (John Donovan)

Mariner wrote:
St. Augustine lived in the 5th century AD. He proposed biological evolution (which shows how much it "conflicts" with religion). I don't know if he was the first, though.

There you go again! Misconstruing words. Obviously, by 150 years ago I was referring to evolution by natural selection. Or did you want to credit St. Augustine with that as well?

So biology doesn't conflict with religion, only cosmology? But I suppose you'll have to include evolutionary psychology as well, based on our previous discussions.

Mariner wrote:
I'm patiently waiting for your explanation about uncertainty, as well as about the sound, taste, and odor of an argument . Also, no, I don't need to read the link to say what science can and can't do -- I doubt that the link addresses epistemological issues. This is not a question for science to answer, by the way (what science can or can't do). You'll find this answered in metaphysical works, not in scientific ones.

So you absolutely refuse to read the essay? Hmmm... then I guess we're at an impasse. I can't explain about uncertainty unless you're willing to try and understand the concepts involved... But being the nice guy that I am, I'll compromise and give you a hint so you can begin reading. OK?

Quantum fluctuation requires no cause, since it is pure randomness. Which, by the way, is different from the Uncertainty Principle which merely defines restrictions on our ability to make measurements in this one universe. Instead, in a multiverse, all probabilities actually occur. As Stenger says, these "uncaused, random quantum fluctuations in a flat, empty, featureless space-time can produce local regions with positive or negative curvature" which is exactly what one would expect if there was nothing there to begin with.

Actually I think your last sentence pretty much sums up your position. Since you pre-define the only acceptable answer as metaphysical, then I suspect you will indeed only find your "answer" in "metaphysical works"- evidently that is the only place you will consider even looking for an answer!

Of course it may not be the *right* answer, but that's the whole beauty of metaphysics- you'll never know if it's not! After all, isn't that the whole point of metaphysics and religion- to protect our beliefs from the real world? We surely wouldn't want to find if we were wrong, would we?
By Probeman (John Donovan)

Mariner wrote:
Nevertheless, science (of any kind) does not conflict with religion (of any kind), basically because religion is concerned with two non-scientific domains (metaphysics and ethics).
Well better tell that to the Christians (and the New Age woo-woos for that matter), because they sure don't

like what science is telling them about the natural world and human nature.

Mariner wrote:
If I'm looking for the answer of a mathematical question, I won't read social science. If I'm looking for the answer to "why did the US invade Iraq", I won't look for the answer in a mathematical journal. This is simply common-sense. As long as the link is scientific, it is besides the point -- whatever is the chosen scientific theory, and even if we assume that it is the ultimately true scientific theory, the problem I'm talking about still remains. This should be clear by now.
What's clear is that you absolutely won't read the essay in spite of the fact that based on your anthropic arguments (e.g., the gravitational ratio) it is clearly appropriate that you should. You remind me of Galileo's colleagues that refused to look through his telescope!

You have built an intellectual prison for your mind. Shame on you.

For the rest of you that are still willing to learn new ideas, I provide here some (at least in principle) testable ideas that are entirely consistent with the current inflationary standard model of cosmology which itself has been strongly upheld by recent accelerator experiments and COBE deep sky measurements. Yes, it's still only a hypothesis not a theory, but it does explain how the fundamental constants and physical laws can be derived from a completely homogeneous void. Now if Mariner wants to call a completely featureless, homogeneous void the mind of God, he's welcome to. But since this void couldn't even contain a single bit of information, it's a pretty simple mind in any case.

The basic idea is that as we go back in time, temperature increases, which essentially means that forces that resulted from symmetries (that is less complex, more homogeneous properties) being broken as the universe cooled, become a unified property or force. Ultimately in the first few moments of the big bang, the physical constants and forces that we know and love congealed out of this featureless substance though random quantum fluctuations.

I'd be especially interested from those still at the undergraduate level to let me know if they think this kind of presentation is too difficult for non-science major students.

> "Let me begin by addressing two commonsense notions: (1) you cannot get something from nothing, and (2) the order of the universe requires the pre-existence of an active intelligence to do the ordering. I will leave it to the theologians to explain how the postulate of a creator God solves the problem of _creation ex nihilo _, since God is something that, itself, must have come, uncreated, from nothing. Instead I will address the physics issues implied by the creation of the universe from nothing. In physics terms, _creation ex nihilo_ appears to violate both the first and second laws of thermodynamics.
>
> The first law of thermodynamics is equivalent to the principle of conservation of energy: the total energy of a closed system is constant; any energy change must be compensated by a corresponding inflow or outflow from the system.
>
> Einstein showed that mass and energy are equivalent, by E = mc^2. So, if the universe started from "nothing, " energy conservation would seem to have been violated by the creation of matter. Some energy from outside is apparently required.
>
> However, our best estimate today is that the total energy of the universe is zero (within a small _zero point energy _ that results from quantum fluctuations), with the positive energy of matter balanced by the negative potential energy of gravity. Since the total energy is zero, no energy was needed to produce the universe and the first law was not violated.
>
> The second law of thermodynamics requires that the _entropy_, or disorder, of the universe must increase or at least stay constant with time. This would seem to imply that the universe started out in a greater state of order than it has today, and so must have been designed.

However, this argument holds only for a universe of constant volume. The maximum entropy of any object is that of a black hole of the same volume. In an expanding universe, the maximum allowable entropy of the universe is continually increasing, allowing more and more room for order to form as time goes by. If we extrapolate the big bang back to the earliest definable time, the so- called _Planck time _(10^-43 second), we find that universe started out in a condition of maximum entropy-- total chaos. The universe had no order at the earliest definable instant. If there was a creator, it had nothing to create.

Note also that one cannot ask, much less answer, "What happened before the big bang?" Since no time earlier than the Planck time can be logically defined, the whole notion of time before the big bang is meaningless.

Furthermore, within the framework of Einstein's relativity, time is the fourth dimension of spacetime. Defining this fourth dimension as ict, where t is what you read on a clock, i = sqrt(-1), and c is the speed of light, the coordinates of time and space are interchangeable. In short, time is inextricably intertwined with space and came into being "when" or "where" (language is inadequate to mathematics here) spacetime came into being.

Spontaneous Order

So, where did the order of the universe come from, if it did not exist at the "beginning"? Where did the laws of physics come from, if not from some great lawgiver? We are now beginning to grasp how the laws of physics could have come about _naturally_, as the universe spontaneously exploded in the big bang.

To understand this, we first have to recognize the prejudice that is built into the whole concept of physical law. When Newton developed mechanics and gravity, the Judeo-Christian notion of God-given law was already deeply engraved in his thinking, by his culture. Even today, science is interpreted by public, media, and scientists alike as the process of learning the "mind of God."[1]

However, the laws of physics, at least in their formal expressions, are no less human inventions than the laws by which we govern ourselves. They represent our imperfect attempts at economical and useful descriptions of the observations we make with our senses and instruments.

This is not to say we subjectively determine how the universe behaves, or that it has no orderly behavior. Few scientists deny that an objective, ordered reality exists that is independent of human life and experience. We simply have to recognize that the concept of "natural law" carries with it certain metaphysical baggage that is tied to our traditional, pre-scientific modes of thought. We are going a step beyond logic to conclude that the existence in the universe of order, which we conventionally label as the laws of nature, implies a cosmic lawgiver.

We are gradually learning that several of the laws of physics, those that seem the most universal and profound, are in fact little more than statements about the simplicity of nature that can almost go unsaid. The "laws" of energy, momentum, and angular momentum conservation have been shown to be statements about the homogeneity of space and time. The first law of thermodynamics, conservation of energy, results from there being no unique moment in time .[2]

Conservation of momentum follows from the Copernican principle that there is no preferred position in space. Other conservation laws, such as charge and nucleon number, also arise from analogous assumptions of simplicity.

For the mathematically inclined, the conserved quantities are _generators_ of the symmetry transformations involved. A homogeneous universe, one with a high level of symmetry, is the simplest of all possible universes, just the kind we would expect to happen by accident. In such a universe, many conservation laws will automatically exist.

In general, the conservation laws need no explanation beyond the mathematical symbols used to

represent the corresponding symmetry. On the other hand, an observed violation of a conservation law would demand an explanation, for then we would have evidence for a deviation from simplicity and homogeneity. To explain this deviation, we have to go beyond the assumptions that require the fewest parameters, that is, are the most economical.

By an equally simple but somewhat different argument, the second law of thermodynamics is found not to be some underlying principle of the universe, but rather an arbitrary convention we humans make in defining the direction of time. Nothing in known fundamental physics forbids the violation of the second law. No mechanical principle prevents the air emptying from a room when you open the door, killing everyone inside. Physics does not forbid a human from growing younger or the dead rising! All that has to happen for these "miraculous" events is that the molecules involved are accidentally moving in the right direction at the right instant. Of course these miracles are not observed to happen except in fantasies, but only because they are so highly unlikely.

We introduce the second "law" to codify what all of human experience testifies, that air does not empty from a room, people do not grow younger, and the dead do not rise. But these events are not impossible, just highly improbable. Influenced, like Newton, by our culture, we falsely state that these unlikely events cannot happen because the second law "forbids" them from doing so.

The second law of thermodynamics, along with the arrow of time and the notions of causality and determinism, arise as statistical statements about the likelihood of events that emerge as principles we invent to describe the world of everyday experiences.

Other, more complex and less universal laws of physics appear to arise from _spontaneously broken symmetries_. When a quantity such as momentum is observed not to be conserved, we introduce the notion of a "force" to break the corresponding spatial symmetry. By this means, the force laws and other principles that give structure to the universe arise as spontaneously broken symmetries--accidental, uncaused events that occurred in the first fraction of a second of the big bang as the expanding universe cooled. The process can be likened to the formation of structure in a snowflake from water vapor, or the magnetizing of a bar of iron cooled below the Curie temperature.

The Appearance of Structure

While the details of the symmetry-breaking mechanism referred to here are not fully developed, and further work may negate this picture, we have at least one highly successful example of how the process of spontaneous structure formation from underlying symmetry and chaos can have come about. The current theory of elementary particles, the so-called _Standard Model_ of quarks and leptons (the electron and neutrino are examples of leptons), agrees with all existing observations about the material world. In two decades since its inception, no violation of the Standard Model has been observed.

Within the framework of this model, electromagnetic and weak nuclear forces are viewed as low-energy manifestations of a single, unified _electroweak_ force that applies at higher energies and smaller distances. At the level of most observations, these forces are vastly different. The electromagnetic force acts over macroscopic distances, while the electroweak force is confined to the atomic nucleus. The two forces differ enormously in strength. Yet the Standard Model treats them in a unified fashion at high energies, and explains their differing structure by means of spontaneous symmetry breaking that occurs at lower energies.

Further progress in understanding these fundamental mechanisms has been slowed by the canceling of the Superconducting Supercollider that would have probed beyond the Standard Model. A less ambitious (although still gigantic) project is going ahead in Europe, but it will be a new millennium before physicists have the data they will need to determine whether spontaneous symmetry breaking is indeed the process by which the laws of physics evolved in the first fraction of a second of the big bang. Currently, all we can say is that we have one firm example, and many

theoretical suggestions, that will not be tested experimentally for another decade. Even if they all fail these tests, it seems highly unlikely that the process will yield evidence for the creator of Judeo-Christian-Islamic theology."
By Vic Stenger
From Intelligent Design: Humans, Cockroaches, and the Laws of Physics
By Probeman (John Donovan)

Mariner wrote:
I'm not using the "particular values of the physical constants", I'm using the fact that these values are, well, constant (a metaphysical fact, or assumption if you prefer).

Oh... my... god...

Is that all you're wondering about? If you'd read the darn essay you'd had this question answered many, many posts ago. This is a perfect example of the problems that WILLFUL ignorance causes in the world.

The short answer is that physical constants are constant because once the symmetries spontaneously break from falling temperatures in a cooling universe, they are "frozen" into the values we observe. They are not constant if you again raise the temperatures high enough. This was verified in the electroweak unification experiments done a few years ago.

You really ought to broaden your reading a little- your metaphysics suffers from ignorance of physics.
By Probeman (John Donovan)

EcceQuiTollisPeccataMundi wrote:
To prove this notion of a creator, leads us back to the cosmological argument with its position on causality. And since one cannot use the category of causality beyond experience, you are simply left with a notion of a "first cause," or creator, as it were; thus in turn, you are right back to the ontological argument and all its flaws.

Ecce, I was aware that Kant had written on the problems with the argument from Design, it just surprises me that we're still arguing it. But I shouldn't be since there are good evolutionary reasons for teleological beliefs like this (see below).

Let's assume that science has it's cosmology all wrong (not likely given that we can calculate the electron's magnetic moments to 10 decimal places to agree with experiment), and look at the argument from design again.

The Argument from Design or Mind First
(1) Order (or complexity or regularity) implies a Designer or Mind
(2) The universe displays order (or complexity or regularity)
(C) Therefore the universe had a Designer or Mind First

Now here's the problem:
If premise (1) is true, then the Designer, who's Mind is ordered (or complex or contains "regularities"), must also have had a Designer (a super-Designer), and that super-Designer, who's Mind is also ordered, must then also have had a Designer (a super-duper-Designer), and so on, ad infinitum. This regress is of course unacceptable to theists, and ends up explaining nothing about the origins
of order in the universe. On the other hand, if it is denied that the Designer had a super-Designer, the theist

ends up conceding that premise (1) of his argument is false.

So, no matter what new developments occur (or gaps remain) in cosmology, the argument from design or mind first fails on what would appear to be logical grounds.

So why is the teleological argument from Mind so seductive and intuitive? Here I would recommend Scott Atran's book, "In Gods We Trust: The Evolutionary Landscape Of Religion":

http://www.amazon.com/exec/obidos/tg/detail/-/0195178033/qid=111 0315005/sr=1-1/ref=sr_1_1/104-9559550-3216704?v=glance&s=books

and Stewart Guthrie's book, "Faces in the Clouds: A New Theory of Religion":

http://www.amazon.com/exec/obidos/tg/detail/-/0195098919/qid=111 0315022/sr=1-1/ref=sr_1_1/104-9559550-3216704?v=glance&s=books
By Probeman (John Donovan)

Mariner wrote:
And you ought to read the thread again... and again... and again... until you accept that none of this is relevant.

Well I disrespectfully disagree. You are making anthropic arguments and trying to dismiss "chance" as a cause, when these exact issues are being addressed in the inflationary standard model.

Mariner wrote:
You might as well answer my question.

Well go ahead and try to ask something that hasn't been answered 10 ways already.

Mariner wrote:
It just says that order can't arise by chance, metaphysically speaking, since chance requires order to exist in the first place. Perhaps the order has always been there. But it can't have come about by chance.

No. The only thing that order requires is the random breaking of symmetry (and a lot of time).

Think about for a second. Let's say you have a perfectly homogeneous substance- no order, maximum symmetry, completely homogeneous. Then as it cools, it randomly fractures. You now have a substance which has been decreased in symmetry into something more complex. You could even use this less symmetric substance to store a single bit of information. Therefore chance can produce order. The fundamental constants and forces are formed in an analogous process of symmetry breaking which as the universe cooled further created the order we observe.

In fact only time and chance is really required for order since over extremely long periods of time just chance alone will produce order from random molecular motions. Maybe we're just really lucky!

Order can also come about from mere probability. Consider that in the case of an infinite universe with matter evenly distributed over the largest scales (consistent with the standard model), there is an exact copy of Mariner refusing to read an essay which directly responds to his question some 10^10^29 meters from here. Is this result unintuitive? No doubt, but it comes from mere probabilities.

Mariner wrote:
I am just pointing out that chance fails as an explanation. Any other explanation can be accepted. That I can see only design and irreducibility as alternatives may be a failure of my imagination

You have a good imagination I suspect. I think it's more a failure of willingness to learn some new physics which possibly explains how order can arise from randomness. The point being that even if it's just a possibility consistent with everything we know, it shouldn't be dismissed as you so desperately seem to want to.

Remember, from a metaphysical perspective, just as chance doesn't fail as an explanation for biological order, so it doesn't fail as an explanation for cosmological order. The problem is that you want God or irreducible as the two options when of course they are really just one option, since God is irreducible.
By Probeman (John Donovan)

Mariner wrote:
Exactly. And what determined the ranges and conditions in which the universe could have broken its primordial symmetry?

Nothing. Just randomness. That's my whole point. **The breaking of symmetry itself creates order by decreasing symmetry! It doesn't start with order, it starts with total homogeneity and through random breaking of symmetry creates order.** In fact according to the multiverse hypothesis, every random permutation of symmetry breaking actually occurs. We just happen to be here in this one.

Of course since this refutes your mind first religious beliefs you can't accept it regardless of how much evidence exists. That's the definition of piety isn't it? Belief in spite of evidence?

To all readers: Mariner's constant and repetitive mantra "Order cannot come from Chance", "Order cannot come from Chance", based so far as I can tell, on two questions (what determined the ranges and conditions and/or why are the physical constants constant?), which has been adequately explained as spontaneous symmetry breaking and experimentally verified in the case of the electromagnetic and weak forces, seems to have emotional roots deeper than the rational seeking of knowledge and understanding.

I note the following quote by Mariner from earlier on in the thread, which I suspect ultimately explains his avoidance of information and resistance to any scientific explanation of how order can evolve from chance, no matter how reasonable and well supported.

Mariner wrote:
Either way, one has to accept the Absoluteness of either God or "Natural Law". There is no doubt as for which one is the most fruitful choice. At least by accepting a mind behind it all, one can be reasonably sure that there is a template, that the world makes sense. (And made sense in the past, and will go on making sense in the future).

It is even better -- for purposes of inquiring about it all -- if we suppose that our own minds are somehow built similarly, and that therefore our reasoning processes can achieve knowledge; which is one very great reason why science was a product of the Christian West. Compare it with (for example) Hindu theories of how the world is an illusion.

Goddidit is "fruitful"? Exactly how so? Because it makes you feel better?

Anyway, I have no idea what law (the Mariner Law?) says the universe has to "make sense" (the deeper science looks, the less intuitive it seems to be), but in any case I wonder if what's really going on in this thread is merely Mariner's religious chauvinism- a preference for Christian as opposed to Hindu creation

stories? I note the following creation hymn from the Hindu Rig Veda :

> Then there was neither the non-existent nor existent. There was no realm of air, no sky beyond it. What was concealed, and where? And what gave shelter? Was there any water of unfathomed depth?
> There was no death then, nor was there any immortality. There was no torch of day and night. There was that One, which breathed mindlessly by its own nature. But apart from it there was nothing whatsoever.
> First there was only darkness concealed in darkness. All was undiscriminated water. That One, existing in a formless void, was born by the great power of heat.
> After that, Desire arose in the beginning - desire, the primal seed and germ of Mind. Sages who searched with their heart discovered the existent's kingship in the non-existent.
> Across this they extend their dividing line: what was above it then, and what below it? There were originators, and there were mighty forces. Free action was here and energy was up there.
> Who truly knows and who can here declare from where it was born and from where this creation comes? The gods came later than the production of this world. Who knows then from where it first came into being?
> He, the first origin of this creation, whether he formed it all or did not form it; whose eye controls this world in highest heaven, he truly knows it, or perhaps he does not know. [10:129]

So, in some ways the Hindu creation story, "All was undiscriminated water. That One, existing in a formless void, was born by the great power of heat", seems metaphorically similar to the current big bang inflationary general concepts. On the other hand, it also describes something very similar to the Mind First explanation that Mariner espouses, "After that, Desire arose in the beginning - desire, the primal seed and germ of Mind."

Science has historically replaced many religious and metaphysical beliefs with scientific explanations. For example, that the Earth is the center of the universe, that the heart is the seat of self-awareness and that life is designed by God. This process continues today in cosmology and cognitive science. So if we're merely discussing religious creation stories, I'm done. But if Mariner actually wants to discuss recent scientific explanations that may touch on his religious and metaphysical beliefs, I'll continue. But if he steadfastly and dogmatically refuses to acknowledge that science has and will continue to replace metaphysics, I guess there's not much point in doing so.
By Probeman (John Donovan)

Socrastein wrote:
By the way, if it helps any - I understand exactly what you're getting out when you talk about the problem of explaining 'ground work'. It seems your argument is one level higher than probemans (As much as I love him!) and he isn't seeing this. He's assuming the groundwork to explain things below it, and you're unconcerned with things below it and are asking for a direct explanation for the groundwork itself. Right?

I love you too Soc.

Ok, let's assume that we need to explain the "ground work." In the case of the inflationary standard model of physics the "ground work" is what? The totally featureless, homogeneous, unpropertied, no space, no time void itself?

Now why would something that has absolutely no properties or features (or existence for that matter) even require explanation? It's like asking: why is there nothing instead of something?

All the inflationary standard model can hope to answer is: why is there something rather than nothing? And that is what I've been trying to explain.

In any case I don't see how this helps Mariner anyway. A mind requires complexity, certainly a mind "similar to ours" as he no doubt prays for. And the standard model clearly shows that the further back in time we go the less complex the universe is.

So far as we can tell the universe started simple and ended up complex. Too bad for mind first "explanations."
By Probeman (John Donovan)

Mariner wrote:
Then there isn't much point in doing so. Myself, and all philosophers, will continue to "dogmatically and steadfastly" believe in logic. And you'll continue to say that logic is "reliable but not certain". And so the world goes on.

Logic? That's a laugh. You believe in one thing my friend- God. Everything else you believe is predicated on that starting point. As you often say, for you it's "Mind First", regardless of the evidence!

And for the 1000th time- it's the applications of logic to the natural world that are problematic (e.g., Mariner's Law), not logic itself. Jeez...
By Probeman (John Donovan)

Mariner wrote:
Really, honestly, you should read the thread again. It helps a lot, if you want to criticize an argument, to understand it. You keep criticizing arguments which I haven't made, and often with arguments with which I agree.

Well you can't fault me for not trying! Your debate tactic seems to be simply to deny that anything I've said or quoted touches on your "argument". How clever. But let's go back to the beginning of this thread where you state that there are at least three "explanations" for order in the universe:

1. god
2. chance
3. no explanation

Have I got that right at least?

Now since god is unexplainable metaphysically (right?) that leaves unexplainable or chance. But you want to dismiss chance because, as you say repeatedly, it "doesn't make sense" (Mariner's Law). But since an explanation from chance is completely consistent with modern physics (order from non-order through spontaneous symmetry breaking), why exactly do you claim "it doesn't make sense"? Why should the nature of the universe depend on everything making "sense" to Mariner?
By Probeman (John Donovan)