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## THE ANTHROPIC PRINCIPLE IN A FIRST-CAUSE UNIVERSE

Antonio Leon

Retired Professor. Independent researcher in the foundations of science.

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**Abstract.**-The universe was and is in a permanent state of directional evolution, in the direction of increasing its entropy (isotropy). The constant direction of this evolution is only possible if this evolution is always under the control of the same consistent set of natural laws. An immediate consequence of this consistency is that no object, including the universe, can be the cause of itself. It is from this perspective of a consistent universe originating from an unknowable first cause outside the universe itself that the Anthropic Principle is deduced here.

**Keywords:** Principle of Directional Evolution, Theorem of the Consistent Universe, Theorem of the Formal Dependence, first cause, entropy, isotropy, anisotropy, intentionality, Anthropic Principle, near death phenomena.

### 1 The Anthropic Principle

It is well known that until Copernicus, man considered himself to be at the center of the universe, a position he had to abandon when he accepted the heliocentric system. However, in 1974, B. Carter proposed that man, although no longer central, still occupies a privileged position in the universe [1]:

... our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers.

This statement is known as the weak form of the Anthropic Principle. Carter himself proposed the strong form of this principle: [1]:

The universe (and hence the fundamental parameters on which it depends) must be such as to admit the creation of observers within it at some stage.

As expected, the Anthropic Principle has been and continues to be a very polarized topic of discussion, while for some it is an uninteresting triviality, for others it has a profound meaning. In this article a new and significant detail is added to the discussion: the directional evolving universe with a necessary first cause unknowable from within the universe itself.

### 2 The directional and consistent universe

Physics, like all other sciences dealing with the physical world, must be built on fundamental principles of broad inductive evidence. This is another consequence of the Aristotelian infinite regress of arguments. Among these principles is the Second Law of Thermodynamics, which is generalized here for all natural sciences in the following:

**PRINCIPLE OF DIRECTIONAL EVOLUTION (PDE):** The universe always evolves in the same direction of increasing its entropy.

where entropy can be replaced with isotropy, since one can be expressed in terms of the other [8, pdf]. The empirical evidence for PDE is overwhelming: the universe has been producing the same final ef-

fects under the same initial conditions for more than 13.8 billion years. On the other hand, the universe is such an enormous and ancient object that it is practically inevitable that, coupled to that irreversible increase of isotropy, open systems arise in which its anisotropy grows, always with the global balance in favor of the increase of isotropy in the closed universe. Among these open systems of increasing anisotropy are all living beings on Earth.

Evolving always in the same direction also has formal consequences. Indeed, the PDE and the first two laws of logic allow us to prove the following:

**THEOREM OF THE CONSISTENT UNIVERSE:** The universe evolves under the control of a unique set of invariant and consistent physical laws.

*Proof.*-If the physical laws governing the evolution of the universe were not an invariable set of consistent laws, changes would occur with equal frequency in all directions, and no progress would be possible in any of them. Thus, directional evolution would not be possible, which violates the Principle of Directional Evolution. Thus, the universe evolves under the control of a unique set of invariant and consistent physical laws. □

The Theorem of the Consistent Universe could be chosen as an inductive principle, and from it the PDE could be deduced as a theorem. There is overwhelming empirical evidence for both, and in fact their claims reinforce each other both inductively and formally. However, the consistent universe alternative would have to be extended into the past, for which we do not have the same empirical evidence. On the contrary, we have been able to confirm the existence in the universe of identical objects of different ages, as well as very complex objects whose formation requires millions of years of directional evolution. Therefore, it seems appropriate to maintain the PDE as such an inductive principle.

### 3 The first cause of the universe

It is not common, though not impossible, to find references in scientific texts to the infinite regress of concepts, arguments, and causes, especially the

latter (probably because of the anti-religious prejudices of scientific materialism). It is then convenient to use the PDE to prove the following:

**THEOREM OF FORMAL DEPENDENCE:** No concept defines itself; no proposition proves itself; no object is the cause of itself; and no cause is the cause of itself.

**Proof.**—If concepts could define themselves, their corresponding definitions would be inaccessible to our formal and experimental sciences, so the Theorem of the Consistent Universe would not hold, and the PDE would be impossible. If propositions could prove themselves, then everything could be proved, and then sets of consistent laws would be impossible, which violates the Theorem of the Consistent Universe. If physical objects and causes were the cause of themselves, then they would have attributes unknowable to human reason and nothing could be formally proved about them, which also violates the Theorem of the Consistent Universe.  $\square$

Everything that is stated in the Theorem of Formal Dependence may seem obvious, and it is, but everything that is stated there is a logical consequence of the PDE through the Theorem of the Consistent Universe. In fact, the directional evolution of the universe is only possible in a consistent universe, and in a consistent universe it is impossible for a concept to define itself; for a proposition to prove itself; for an object to be the cause of itself; or for a cause to be the cause of itself.

The Theorem of Formal Dependence explains why axioms, or fundamental principles, are necessary in all sciences. It also explains the need to use primitive concepts that have not been and cannot be defined in terms of other more basic concepts, and if they could, these new more basic concepts would become the new primitive concepts. The case of primitive concepts is well known and is accepted in all sciences, except in physics, where a certain semantic chaos reigns [11, p. xiv]:

Unfortunately, physics has become infected with very low standards of clarity and precision on foundational questions, and physicists have become accustomed (and even encouraged) to just "shut up and calculate," to consciously refrain from asking for a clear understanding of the ontological import of their theories.

Indeed, even words with opposite meanings can mean the same thing to some authors. [7, p. 7, Kindle Ed.]:

*Nothing* is in everything as material and physical as *something* is, especially if it is defined as the *absence of something*.

This immediately leads to contradictions of the type  $p \implies (q) \wedge (\neg q)$ , which obviously violates the Second Law of Logic.

The most remarkable and least considered cases

of infinite regress are those of objects and causes. Indeed, according to the Theorem of Formal Dependence, no object can be the cause of itself. But if no object can be the cause of itself, neither can the universe as an object be the cause of itself. It is therefore necessary to assume that it is not possible to explain the origin of the universe with the science constructed from within the universe, because that would be to admit that the universe explains itself, and then that the universe is not consistent, which is not the case (Theorem of the Consistent Universe). A complete explanation of the universe is impossible without an unknowable first cause that cannot be deduced from the knowledge extracted from the universe itself.

## 4 Infinity and the Universe

As just indicated in the previous section, according to the Theorem of the Formal Dependence, the universe cannot be the cause of itself; it must have a first cause unrelated to the knowledge of the universe itself. And that first cause is unknowable to human beings because all our knowable causes are derived from our own experience within the universe. We can only speculate about the nature of this first cause.

There are many attempts to avoid the singularity of the origin of the universe. In some cases by using infinitist strategies: eternal universes, infinite universe, infinite number of universes, infinite cycles of creation and destruction of universes. But if infinity (the actual infinity, not the potential infinity) were inconsistent, all these strategies would lead to inconsistent universes, incompatible with the consistency deduced from the directional evolution of our observable universe. Other authors defend the idea that the universe originated from a fluctuation out of nothing. But then we would have to accept that nothing is not nothing, but something with the capacity to fluctuate, and that something would also have to be explained by a first cause.

I usually include in the articles that require the use of the infinity inconsistency a small demonstration of that inconsistency; this one has it in the last appendix, and it will take the reader less than three minutes to read it. If the proof does not convince you, you can stop reading this article right there. If, on the other hand, you find the proof reasonable, you may also find the rest of the article reasonable, which simply speculates about one aspect of the first cause of the universe and its consequences for the formal consistency of the observable universe and for the Anthropic Principle.

## 5 The Anthropic Principle

We know nothing, and can never know anything, about the first cause of the universe, because it must be alien to the universe itself, and we are exclusive components of that universe, and all our knowledge comes from our experience in that universe. As stated above, we can only speculate in logical terms about that first cause. And one of the things we can speculate about is whether or not the observed

directional evolution of the universe should be included in the first cause. In other words, is the formal directional evolution of the universe accidental and random, or should it be included in its unknowable first cause, whatever that first cause may be?

In both alternatives it would be necessary to consider the existence of another reality outside the observable universe with the capacity to create universes. In the case of the first alternative, and taking into account the known characteristics of our observable universe, we would have to consider the very high improbability that a random accident would make the universe evolve in the same direction for billions of years. In the case of the second alternative it seems reasonable to assume the existence of a certain intentionality in creating a directionally evolving universe, and therefore a consistent universe. The conclusion of this brief speculation is, then, that it is more reasonable and probable to suppose that a universe that evolves always in the same direction, that is, a consistent universe, has been created intentionally.

Indeed, an interesting way to increase the isotropy (entropy) of the universe is the appearance of open systems coupled to their physical environment; these open systems exchange matter and energy with their environment and can increase their own anisotropy in exchange for increasing the isotropy of their environment, and in such a way that the total balance is the net increase of isotropy of the whole, and therefore of the universe.

Given the age, size, and number of objects in the universe, the probability of such open systems appearing is at a maximum. Among these open systems of increasing anisotropy are living beings. It could then be affirmed that in the observable universe the probability of the appearance of living beings, including conscious living beings, is very high. This high probability would be confirming the strong version of the Anthropic Principle.

In short, the most reasonable speculation about the first unknowable cause of the universe is that it may have been created intentionally as a universe that evolves always in the same direction, knowing that one of the consequences of a universe always evolving in the same direction of increasing its isotropy would be the emergence of life, intelligence and sensibility. In these conditions, the Anthropic Principle would be intentional, which obviously goes against the dominant stream of scientific materialism.

## 6 Physics and near-death phenomena

For some years now, the medical sciences have begun to take a serious interest in the so-called near-death experiences (NDE), mainly due to the enormous number of cases recorded and analyzed [12, 4, 5, 6, 10, 15, 14, 13, 3, 2]. In the vast majority of these cases, there are common elements that define an almost universal pattern. For this and other reasons, medical analysis has long pointed out

that NDE are neither hallucinations nor side effects of drugs on patients. Nor can they be evolutionary elaborations of the brain to make the process of death more bearable: death has no reproductive consequences, and then no evolutionary consequences, i.e. NDE could not have been fixed by natural selection. On the other hand, the physical sciences, that pays attentions to multiverses and the like, tend to view the near-death phenomena within NDE with derision and contempt. But too many cases have been analyzed to continue with this attitude. Other realities, obviously related to the Anthropic Principle, can be glimpsed in these NDE. A reason why physics should begin to take an interest in them.

## APPENDIX

### The actual infinity is inconsistent

The demonstration of the following theorem is an abbreviated version of [9, p. 59-63 Link], where the reader can find another 40 different proofs. You can also see here ChatGP4's commentary on the demonstration.

**Theorem 1** The Axiom of Infinity is inconsistent.

*Proof.*-The interval of rational numbers  $\mathbb{Q}_{01} = (0, 1)$  is denumerable and densely ordered. So, it can be put in one-to-one correspondence  $f$  with the set  $\mathbb{N}$  of natural numbers in their natural order of precedence; and  $\mathbb{Q}_{01}$  can be rewritten as the set  $\{f(1), f(2), f(3), \dots\}$ . Let now  $x$  be a rational variable initially defined as  $f(1)$ ; and let (the current value of)  $x$  be compared with the successive elements  $f(1), f(2), f(3), \dots$  so that  $x$  is redefined as  $f(i)$  if, and only if,  $f(i)$  is LESS THAN the current value of  $x$ . Since all elements  $f(1), f(2), f(3), \dots$  of  $\mathbb{Q}_{01}$  are rational numbers which exist as a COMPLETE TOTALITY,  $x$  can be successively compared with ALL of them:

$$\forall n \in \mathbb{N} : x = f(n) \iff f(n) < x \quad (1)$$

Once compared with all elements<sup>1</sup> of  $\mathbb{Q}_{01}$ , the current value of  $x$  is the smallest rational of that set. Indeed, if once compared with all elements of  $\mathbb{Q}_{01}$ , the current value of  $x$  were not the least rational of  $\mathbb{Q}_{01}$ , there would exist at least one element  $f(n)$  in  $\mathbb{Q}_{01}$  such that  $f(n) < x$ . But this is impossible according to (1). Therefore, it was compared with  $f(n)$  and redefined as  $f(n)$ . So, it is impossible that  $f(n) < x$ . But it is also immediate to prove that: Once compared with all elements of  $\mathbb{Q}_{01}$ , the current value of  $x$  is not the smallest rational of that set. In effect, once compared with all elements of  $\mathbb{Q}_{01}$ , and whatsoever be the current value of  $x$ , each element of the infinite set  $\{x/2, x/3, x/4 \dots\}$  is an element of  $\mathbb{Q}_{01}$  less than  $x$ . This contradiction proves the Axiom of Infinity legitimizing the existence of  $\mathbb{Q}_{01}$  as an actual (not potential) infinite totality is inconsistent. Or in other words: a COMPLETE and ordered list, such as the rational interval  $(0, 1)$ , without a first element that starts the list is inconsistent.  $\square$

<sup>1</sup> Though it is not necessary, this is formally proved by induction in [9], and can also be proved by Modus Tollens and by supertask theory.

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