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## **“Cogito ergo mundus talis est” On some metaphysical and epistemological aspects of the Anthropic Cosmological Principle**

This paper deals with one of the basic philosophical questions in modern cosmology: can the so-called “Anthropic Principle”, considered as an alternative to the classical teleology of creation, be an adequate explanation of the evidence that our universe is “fine-tuned” for the emergence of life and consciousness. The main problem with this principle is not its presumed teleology, as it is sometimes wrongly supposed, but quite the contrary: its intention to avoid teleological explanations by including the existence of many universes (“multiverse”) into extended cosmological models. After having compared logical and cosmological many-worlds concepts, this paper reaches the conclusion that the ontological reality of the “multiverse” is an even more problematic presupposition than some properly revised version of teleological causality. This in itself does not imply the classical theistic explanation of creation, since it also yields a pantheistic explanation of the emergence of life and consciousness in our universe.

*Keywords:* Cosmology, Anthropic Principle, Fine-Tuning, Teleology, “Multiverse”, Modal Logic, Consciousness, Pantheism

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Modern cosmology, which is founded on the “standard” model of the beginning and development of the universe from a very dense and hot initial state, popularly called “Big Bang”, has by now collected enough evidence to maintain that our universe has been “fine-tuned” since tiny fractions of its first second. If the initial parameters had been just a little bit different, life could not have emerged. Furthermore, neither planets nor stars and galaxies could have developed out of the primordial “fireball”, and worse still, the elementary particles of matter would not be such as we know them now. For example, if the expansion rate after the first second had been just one part of a million smaller, the universe would have recollapsed already before the so-called decoupling period, i.e. before it became transparent

for the radiation of photons (about half a million years after the Big Bang). Conversely, if the expansion had been one part of a million quicker, it would have prevented gravitation to form galaxies and stars. Some problems of the standard cosmological model, especially the “flatness problem” and the “horizon problem”, which also seem to suggest some kind of initial fine-tuning, might indeed be solved by the “inflation” hypothesis, conceived as a “phase transition” which is supposed to have occurred because of the broken symmetry between basic physical forces. Anyway, in this case the physical laws of inflation itself had to be fine-tuned.

One might argue that in these and other similar cases fine-tuning is bound to the standard cosmological *model*, which in itself has not been definitely verified yet, particularly in its supplementary hypotheses, like inflation and others. However, many examples of fine-tuning of nature are independent of cosmology, being just facts within particle physics, for instance, the difference between mass of a proton and a neutron (equivalent approximately to masses of two electron): if this difference was not so fine-tuned, the existence of stable elements would not be possible, i.e., most elements would be radioactive, so that large molecules, on which life is based, could not be formed from atoms. And this is just one piece of a much larger puzzle: the values of basic *physical constants* (the gravitational constant  $G$ , the velocity of light  $c$ , Planck’s constant  $h$ , etc.) are not derived from the physical theories where they occur, but are just measured to be such, namely in *our* universe – that means they are not necessary, but contingent, at least as long as we do not have the “Final Theory”, which is “a dream of” several famous scientists (Weinberg, Hawking & al.).

How is it possible that the universe is so fine-tuned? Why? How come? There are so many other possibilities for the values of basic physical parameters that would yield neither life nor our own existence as observers of the universe we live in. Is it not a deep mystery that out of a huge number of unfavourable possibilities just the right ones were chosen? Or is it just a happy coincidence? We are not willing to accept such incredible coincidences ... John Leslie, the author of the book entitled *Universes* (1989), says: “God would need to be careful which physics he chose.” (Leslie, 63) However, Leslie puts this rather ironically, since he is not a theist, but he declares himself a sort of pantheist or “neoplatonist”. So, is there some other way to explain the fine-tuning of the universe, in case “God’s design” (or “God’s providence” in classic terms) is unacceptable for us? Can we escape the dilemma between the theistic theological explanation and the incredible “coincidences” that the initial cosmological parameters just happened to be fine-tuned for

us? There is a third way, which has actually been chosen by Leslie as well, namely an explanation by the “Anthropic Principle”.

The “Anthropic Principle” was introduced in cosmology by Brandon Carter in 1974. In a way he set it up against the general trend of modern astronomy and/or cosmology, expressed by the “Copernican Principle” which states that our location in the universe is not exceptional: we are not in the center of the World, as the ancients believed, but just the contrary, in our location on the planet Earth, in the Solar system, in the Milky way galaxy ... we are not privileged at all. Although Carter does not reject the Copernican Principle in its original meaning, namely, that we are not privileged in our simple spatial location (i.e. he does not return to geocentrism), he states the privilege of our human, “anthropic” location in some other sense: in the vastness of space we are privileged by our capacity for being *observers*, in the capacity of seeing and thinking about our universe, in our wondering how and why it is so fine-tuned that it has yielded our birth us as observers ... By using this epistemological “strange loop”, Carter formulated the Anthropic Principle in the statement that “what we can expect to observe must be restricted by the conditions necessary for our presence as observers” (Carter, 132), and in brackets he added: “Although our situation is not necessarily *central*, it is inevitably privileged to some extent.” (Ibid.) The Anthropic Principle has already in its original formulation two versions –

the *Weak Anthropic Principle* (WAP) says:

“... we must be prepared to take account of the fact that our location in the universe is *necessarily* privileged to the extent of being compatible with our existence as observers.” (Carter, 133)

while the *Strong Anthropic Principle* (SAP) states:

“... 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. To paraphrase Descartes, *Cogito ergo mundus talis est.*” (Ibid. 135)

Most cosmologists accept the validity of WAP, however, many consider it just as a tautology which does not have any proper explicative value; on the other hand, opinions differ concerning SAP as regards of different interpretations (and also some misunderstandings) of the necessity, expressed in the modal phrase “must be such that ...”, as well as because of the ambiguity of the term “the Universe” – should it be understood as *our* actual universe, or as the unity of all “possible universes”, or even as *every* universe? I think that the last of these three interpre-

tations is wrong. How could “the Universe” mean every universe? However, some well-known interpreters have understood SAP exactly in this way (as we shall see later), and this misunderstanding has led them to the claim that Carter’s Anthropic Principle implies cosmological teleology.

Let us consider first the weak variant of the Anthropic Principle. WAP speaks about our *location* in the universe – the spatial as well as the temporal location, which enables us to observe and this is our privilege. We may ask whether such a principle can explain anything at all, and we might be surprised when reading that some of its advocates believe that WAP gives, for instance, an explanation *why* our universe is so enormous (the Hubble horizon is estimated to be at least ten billion light-years away from us). The proposed “anthropic argumentation” deduces the reason for this vastness of the universe via its required age plus the constant velocity of light as “middle terms”: namely, the universe *must* be at least ten billion years old, in order that heavier elements, which constitute our bodies, would have enough time to be produced in the cores of the stars that exploded as supernovas long ago, scattering heavy elements into space where they gathered again to form our bodies; and since light has a limited and constant velocity, our cosmic horizon has already receded more than ten billions light-years away from us. John Barrow & Frank Tipler, the authors of the famous book *The Anthropic Cosmological Principle* (1986) add the following comment:

“No one should be surprised to find the Universe to be as large as it is. We could not exist in one that was significantly smaller. Moreover, the argument that the Universe should be teeming with civilisations on account of its vastness loses much of its persuasiveness: the Universe has to be as big as it is in order to support just one lonely outpost of life.” (Barrow & Tipler, 18)

A very bold hypothesis, indeed! However, we feel that something is missing in this anthropic explanation of the size of the universe. It is so different from explanations that are common in science, so we cannot help thinking of teleology – we cannot avoid asking the question: Is the universe so huge *because of us*? Here we have to be careful. If we understand the genuine Anthropic Principle properly (irrespective of its version, WAP or SAP), we see that an anthropic explanation of some cosmic phenomenon does not give its teleological cause (*causa finalis*), but only its *logical* reason. But even having assumed this, something is still missing in such an argumentation. For example, in the above case we may ask why lives of stars could not be shorter, why heavy elements could not be produced in some other way, why – after all – the constant velocity of light could not be lower etc. We do not have any

*comparison* with some other universe to be justified in saying that our universe is necessary in some of its properties and contingent in others. Indeed, the Anthropic Principle has its full sense only if we presuppose *many universes*, which remain just hypothetical, of course, since we do not have any access to them, being closed inside our own universe. Only if the domain of the Anthropic Principle is an ensemble of universes or a “multiverse” (according to John Leslie), and if within this domain some parameters are fixed, while other are variable, only then can we apply this principle to the explanation of the fine-tuning of our universe for us, observers – but without a presupposition of the “multiverse”, the Anthropic Principle is indeed an empty tautology, as some of its opponents claim. In order to understand better this crucial point, let us consider again the fine-tuned expansion rate after the first second of the cosmological time: the anthropic explanation of this “incredibly” precise fine-tuning, which counterfactually says that *if the universe were not so fine-tuned at its very beginning, then we, observers, would not be here*, but since we obviously are here, the universe *must* have been fine-tuned – this explanation is effective (of course, if we exclude teleology) only if it presupposes very many universes, most of them without observers, since they have not been fine-tuned for them, and so there, in the majority of those other universes, nobody can put the question on their fine-tuning. The anthropic explanation is founded on the “observational selection effect”, and the latter presupposes *many* universes, not necessarily an infinite set of universes, but at least a large number of them. Leslie compares this observational selection effect with what may be called “a lottery selection effect”, saying that “in the cosmological case a queer kind of observational selection effect guarantees that a ‘non-winning ticket’ – a lifeless universe – will never be seen by anyone” (Leslie, 13). In order to illustrate this point he tells some stories, among them the following:

“The Firing Squad Story can help us to see the correctness of the last point. When the fifty sharpshooters all miss me, ‘If they hadn’t all missed then I shouldn’t be considering the affair’ is not an adequate response. What the situation demands is, ‘I’m popular with the sharpshooters – unless, perhaps, immensely many firing squads are at work and I’m among the very rare survivors’.” (Leslie, 13-14)

The main point here is that the observational selection effect is effective only if many other universes where other firing squads are at work *exist*, i.e. are actual, not just possible universes. Leslie comments his firing squad and other similar stories:

“The proposed observational selection effect which inspires these stories – namely that the universe which we observe must be in the class of life-permitting universes since how otherwise could we living beings be observing it? – cannot operate unless there is *more than one actual universe*. (No Observational Selection Effect without Actual Things from Which to Select! ...) But equally, a multiplicity of actual universes cannot help us much *unless the observational effect is joined to it* ... [since] any universe which wasn't life-containing could not be ‘our universe’ to anybody.” (Leslie, 14)

However, there is an important difference between Firing Squad Story and the cosmological ‘story’ of the Universe which “admits the creation of observers within it”: our experience tells us that there is actually not only one firing squad in the world (alas!), while in principle we could not have any experience of some other universe, since if we had such an experience, another universe would be only a part or a region of our own. But if so – how can we conceive other universes at all? Where does this strange idea that our universe is not the only actual Universe come from? It is quite well known that modern physical theories, especially relativity theory and quantum mechanics, offer several possible ‘scenarios’ for the emergence of ‘many universes’, and here we just mention some of them: 1) different universes are not causally connected since their past light cones do not overlap (following Einstein); 2) different universes are separated in time because of cyclic repeating of big bangs (early John Wheeler); 3) many universes came into being by different breaking of symmetries in the “eternal inflation” (Andrei Linde); 4) many universes are evolving along parallel branches by different collapses of the “cosmic wave function” (following Hugh Everett) etc. We can say that all these scenarios – except causally not connected ‘universes’ in the relativity theory which are in fact *regions* or domains of the same “block universe” – are very tentative and rather speculative, without any empirical justification. Anyway, they are nice ideas, which would, *if they were actual*, indeed offer some nice explanations in cosmology. Brandon Carter, at the end of his famous article, endorses Everett’s many-worlds interpretation of quantum mechanics, saying: “This doctrine would fit very naturally with the world ensemble philosophy that I have tried to describe.” (Carter, 139). Martin Rees, in his popular book *Before the Beginning – our Universe and Others* (1997), uses the word “multiverse” for the ensemble of many universes, and he tries to sum up various scenarios of its coming into being:

“The many-worlds version of quantum mechanics offers one approach to the multiverse concept. The idea of ‘eternal inflation’, though still very speculative, suggests another context in which other universes could exist. ... Inflation may lead to separate universes – separate domains within a multiverse – which cooled down differently, ending up governed by

different laws. Complex evolution would occur only in ‘oases’ where the constants had propitious values. Our oasis must then be at least ten billion light-years across because the physical laws seem the same everywhere we can observe. But the ‘desert’ beyond it could come into view in the remote future, when, maybe  $10^{12}$  years or more from now, light from the edges of our domain has had time to reach us.” (Rees, 248)

Let us go back to the Anthropic Principle. Some critics say that its weak version is just an empty tautology that cannot explain anything. Its tautological nature is supposed to be even more evident from the following equivalent formulation of WAP: “Every thinking being which exists can find himself or herself (or even itself) only there, where a thinking life is possible.” This formulation is indeed very close to tautology, however, it is not quite empty, because it expresses some sort of law, namely a connection between some ‘objective’ experience and ‘subjective’ thinking about it. In this sense WAP is by its formal structure very close to the basic tenet of Kant’s transcendental analytic which claims that the conditions of every possible experience are the same as conditions of the possibility of all objects of experience. Kant’s synthetic a priori principles of knowledge are the same as the principles of possible experience and the latter determine conditions for objects of experience themselves. By analogy we can say that Carter’s Anthropic Principle is the synthetic a priori principle of cosmology which determines conditions for the universe itself, of course *for us*, not ‘*an sich*’. Carter’s main move is a ‘physicalization’ of Kantian turn, whereas the Anthropic Principle preserves a priori status – and that is objected by several of its critics (for example, Heinz Pagels thinks that AP is “a loafer’s approach to science”). To my mind, the reproach of tautologism would be justified in the case when only *one* possible universe existed and within it only one possible location of the observer – *if* so, then AP could not explain anything.

Carter knew that the explicative power of WAP is quite weak, and that’s why he proposed SAP as its stronger version. Let us remind that SAP claims “that the Universe must be such as to admit the creation of observers within it at some stage”. Barrow & Tipler in their already quoted monograph on the Anthropic Principle offer three possible interpretations of SAP:

- (A) “There exists one possible Universe ‘designed’ with the goal of generating and sustaining ‘observers’.”
- (B) “Observers are necessary to bring the Universe into being.”
- (C) “An ensemble of other different universes is necessary for the existence of our Universe.” (Barrow & Tipler, 22)

It is curious that *neither* of these possible interpretations fits the original Carter’s intention in formulating SAP. Point (A) is obviously teleological and as such makes the Anthropic Principle redundant. Point (B) comes from Wheeler’s “participatory” interpretation of quantum mechanics and leads to some sort of subjective idealism. Barrow & Tipler themselves favour point (C), connecting it again with Everett’s many-worlds interpretation of quantum mechanics, and even claiming “that this version of the SAP has consequences which are potentially testable” (ibid. 23). It is not clear why other universes should be necessary for the *existence* of our universe; namely, Carter’s SAP does not speak about existence of our universe, but claims that our universe might be *explained* in its fine-tuning without teleology via “observational selection effect” which presupposes other actual universes – the anthropic reasoning (at least concerning *our* universe) is not ontological, but epistemological.

When discussing the difference between WAP and SAP, as well as when speaking about the relation between AP and teleology, we may argue that Leslie’s point is the closest to Carter’s original intention. Leslie points out: (1) that there is no essential difference between WAP and SAP, since the difference is only ‘extensional’, i.e. it is only a question of how we define terms ‘location’, ‘region’ (or ‘domain’) and ‘universe’; (2) that neither WAP nor SAP include teleological explanations (although they may be compatible with teleology), but they just give *logical* reasons for fine-tuning of our universe. Let us look at these two points more in detail. Leslie’s point (1) is clearly expressed in the following passage:

“Some, while agreeing that WAP has obvious scientific importance, are none the less bitterly hostile to SAP. This is odd indeed since the two principles shade into one another. SAP concerns *our universe*; WAP, *our region or location*; but as we have made clear there just is no single correct way of counting universes and thus of distinguishing them from mere regions or locations. And when one’s speakers universe is another’s large spatio-temporal region, the first’s SAP matter can be the second’s WAP affair.” (Leslie, 135)

In his *Universes* (1989), Leslie tries to overcome the most common misunderstanding of Carter’s Anthropic Principle – which has been unfortunately suggested also by Barrow & Tipler’s influential book *The Anthropic Cosmological Principle* (1986) – namely the wrong opinion that anthropic explanations have to be teleological (that is what we call Leslie’s point (2)). The conjunction *ergo* (‘therefore’) in Carter’s paraphrase of Descartes, *Cogito ergo mundus talis est* (‘I think therefore the world is such as it is’) has exactly the same meaning as in the original Descartes’ dictum *Cogito ergo sum*: the ‘relation’ between *cogito* and *sum* is not ontological

in the sense that *cogito* created its own existence. Descartes was not a solipsist like Berkeley, neither subjective idealist like Fichte, so he did not think that the world is actually created by *cogito*, since *cogito* is (with God's help) just the epistemological basis of world's objectivity, not its 'creator'. *Mutatis mutandis*, the same can be said of Carter's Anthropic Principle: it does not mean that a universe *must* be as it is *in order that* observers are born in it (i.e. *for them* to be born); observers do not create their respective universes in advance. The necessity which is present in both versions of AP, is just a *logical* necessity: our world *must* be such-and-such (fine-tuned for us), because if it was not such-and-such, we would not be here – but we *are* here, *ergo mundus talis est*. The features of my universe are *logical consequences* of myself as observer. The Anthropic Principle does not tell us anything about *causes* of the existence our universe, it states only *reasons* for its suchness. And in this sense there is no basic difference between WAP and SAP, as Leslie points out. The most questionable tenet of the Anthropic Principle is not its presumed teleology, as many opponents think, since it is simply *not teleological* – its real problem is the postulate of *many universes* which is unavoidable if we want the “observational selection effect” to play its role in anthropic explanations. We can say that the Anthropic Principle stands or falls with its proponent's belief that many universes, separated from our universe, *actually* exist. But this is hard to believe.

It is interesting to compare “many universes” in cosmology and “many worlds” in modal logic. The most obvious common feature of cosmological universes and modal worlds is their emergence from *counterfactuals*. The Anthropic Principle states: ‘*If* the universe was different, we would not be here’ – but the universe (*our* universe) is *not* different, so we are here. On the other hand, in modal logic we are familiar with counterfactuals of the type: ‘*If* the weather was fine, we would go for a walk’ – but the weather is actually not fine, so we stay at home. From the formal point of view, these two counterfactuals have the same structure, but from the epistemological point of view there is an important difference between them: in case of weather, we know what *another* kind of weather is like, we have already experienced fine weather, so we can wait till it returns; in case of the universe, we do not know any *other* universe next to our actual universe, and hence the meaning of the sentence ‘*if* the universe was different’ is not quite clear. Of course, we can construct some theoretical models of *other* different universes by varying basic physical constants etc., but there is no way to know if such models indeed represent some other *actual* universes.

As it is well known, some tens of years ago was a lot of discussion on the “metaphysics of modality” among several ontological positions concerning the reality of “possible worlds”. We may call two principal tenets in this discussion ‘actualism’ and ‘possibilism’ – represented by Saul Kripke and David Lewis respectively. Kripke claimed that only our *actual world* is real in the proper sense, while “possible-worlds” which occur in formal modal semantics (actually discovered by Kripke himself) are to be conceived only as hypothetical, abstract replicas of this actual world, as possible counterfactual situations which form an open logical and also cognitive space by describing how world *could* be different. Needless to say, in spite of their ontological unreality, “possible worlds” have a very important epistemological role in our actual world, since our intellect is able to operate only if it has a realm of possibilities at its disposal. However, David Lewis in his “modal realism” argued that the realm of possibilities is not only an intellectual domain, and claimed that *every possible world is real* as an ontological entity: other worlds are real ‘somewhere’, not in spatial, but in ‘metaphysical’ sense of the word. – In order to connect topics of modal logic and cosmology, let us remind of two famous passages, the first is taken from Kripke’s *Naming and Necessity* (1972) and the second from Lewis’s *On the Plurality of Worlds* (1986). When discussing the ontological status of “possible worlds”, Kripke writes:

“I will say something briefly about ‘possible worlds’. (I hope to elaborate elsewhere.) In the present monograph I argued against those misuses of the concept that regard possible worlds as something like distant planets, like our own surroundings but somehow existing in a different dimension, or that lead to spurious problems of ‘transworld identification’. Further, if one wishes to avoid the *Weltangst* and philosophical confusions that many philosophers have associated with the ‘worlds’ terminology, I recommended that ‘possible state (or history) of the world’, or ‘counterfactual situation’ might be better. One should even remind oneself that the ‘worlds’ terminology can often be replaced by modal talk- ‘It is possible that ...’ But I do not wish to leave any exaggerated impression that I repudiate possible worlds altogether, or even that I regard them as a mere formal device.” (Kripke, 15-16)

In the last sentence of this passage, Kripke outlines an ontological position which may be called “moderate realism” (Read, 119). On the other hand, David Lewis advocates the “extreme modal realism” by taking possible worlds at face value:

“... There are ever so many ways that a world might be; and one of this ways is the way that this world is.

Are there other worlds that are other ways? I say there are. I advocate a thesis of plurality of worlds, or *modal realism*, which holds that our world is but one world among many. There are countless other worlds, other very inclusive things. ... The worlds are something like remote planets; except that most of them are much bigger than mere planets, and they are

not remote. Neither they are nearby. They are not at any spatial distance whatever from here. They are not far in the past or future, nor for that matter near; they are not at any temporal distance whatever from now. They are isolated: there are no spatiotemporal relations at all between things that belong to different worlds. Nor does anything that happens at one world cause anything to happen at another. Nor do they overlap ...

... There are so many other worlds, in fact, that absolutely *every* way that a world could possibly be is a way that some world *is*." (Lewis, 2)

How can anyone who wants to keep the ontological and epistemic distinction between possibility and actuality believe and vindicate the claim "that absolutely *every* way that a world could possibly be is a way that some world *is*"? I cannot accept this tenet not even as a working philosophical hypothesis. Surely, this kind of blurring the limit between actual and possible worlds can be very amusing and also inspiring in *fiction*: indeed, we may say that the stories of Jorge Luis Borges, for example, as well as many other fancy masterpieces, are more interesting than 'stories' of philosophers about *reality* of other worlds. Lewis's pragmatic arguments for such a 'baroque' ontology, namely his claims that his "modal realism" is the best solution for problems of modal logic, for the theory of propositions etc., are too short in comparison with the rejection of Ockham's razor which is obviously ignored in his majestic proposal.

In cosmology, the hypothesis of the plurality of universes does not claim that *every* possible universe is 'somewhere' actual, neither that an infinite number of other universes is needed in order that anthropic explanation could be effective. Nevertheless, the set of universes, emerging from some of the before mentioned 'scenarios' for generating a "multiverse", has to be *very large* in order to be an adequate domain for "observational selection effect". So, in spite of some important differences between many-universes theories in cosmology and many-worlds modal metaphysics, we agree with Kripke's note in *Naming and Necessity*:

"... It would also be interesting to compare Lewis's views with the Wheeler-Everett interpretation of quantum mechanics. I suspect that this view of physics may suffer from philosophical problems analogous to Lewis's counterpart theory; it is certainly very similar in spirit." (Kripke, 45, n. 13)

If Everett's interpretation of quantum mechanics is applied to cosmology where it supports anthropic explanations with its many-universes scenario, we have to state that the anthropic cosmological reasoning, in comparison with modal logic, suffers from an even greater "philosophical problem", namely: in *cosmological anthropic arguments* Kripke's modal 'actualism' (or "moderate realism") is useless, since they *require* "modal realism" (i.e. Lewis's 'possibilism') in order to avoid being

empty tautologies. I have already pointed out this problem, having quoted Leslie who states that the “observational selection effect”, which is a necessary condition for anthropic explanations in cosmology, “cannot operate unless there is *more than one actual universe*” (Leslie, 14, see above). This point may be further elucidated by a comparison between observational selection effect in cosmology and natural selection in Darwin’s evolution theory.\*<sup>1</sup> Both theories try to avoid teleological explanations, and in this endeavour they share an important requirement: just as Darwin’s arguments require the objective reality of fossils of extinct living beings, of species which lost their battle in natural selection, in order to explain the evolution of present living beings – in the same manner anthropic cosmology requires the *reality* of other universes, among which many were not fine-tuned for the life of observers, in order to explain the fine-tuning of our universe. Retreat to some kind of modal ‘actualism’ is useless here, since a mere idea that in other *possible* (but possibly not actual) worlds living beings and/or universes *might* have a different evolution, the idea that they *could* be different as they actually are here-and-now is simply not a sufficient argument for explaining our evolution and/or universe. Darwin knew this perfectly well, and that’s why he travelled to the Galapagos and all around the world in search of material arguments for his theory. However, in principle we cannot travel to other universes, and this is a crucial difference between Darwinism and anthropic cosmology. Neither do we have any ‘fossils’ from other universes here, in our universe. We have just several theoretical scenarios how other universes might have come into being, but this is not enough for the conclusion that they *really* are ‘out there’. So the essential premise of every non-teleological anthropic explanation in cosmology, namely the *existence of many universes*, of a “multiverse”, is supported just by an *analogy* with “possible worlds” in modal logic or with many possible branches of evolution in biology – but such arguments are far too weak to justify such a hardly believable claim that there is a large number of other universes besides to our own Universe. This – and not teleology – is the main problem of the Anthropic Principle.

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<sup>1</sup> It is probably not just a coincidence that the first formulation of the Anthropic Principle – then not yet named so – should be credited to a biologist from Cambridge, Charles Pantin, who wrote in 1965: “... if we could know that our Universe was only one of an indefinite number with varying properties, we could perhaps invoke a [cosmological] solution analogous to the principle of Natural Selection; that only in certain universes which happen to include ours, are the conditions suitable for the existence of life, and unless that condition is fulfilled there will be no observers to note the fact” (see: Barrow & Tipler, 19).

Now let us return to the main question of this paper: *if* we are in cosmological explanations of fine-tuning confronted with the dilemma *either* teleology (which usually implies also theology) *or* the Anthropic Principle (which requires many universes) – which horn of this dilemma shall we hold on to? Some people, among them also John Leslie, think that in this case we are not confronted with an exclusive alternative, but with an inclusive disjunction. However, even if he is right, this disjunction is conditioned by some sort of teleological premise, namely the Anthropic Principle is compatible with teleology only in case if it is understood within some broader teleological approach (in this way SAP is welcomed by some ‘anthropic’ minded theists). But the real point and aim of Carter’s AP is to explain the fine-tuning of our universe without teleology. If we presuppose any kind of teleology, AP is simply redundant. So the dilemma *either* teleology *or* the Anthropic Principle remains sharp.

I think that it is harder to accept the existence of many universes as some sort of cosmic teleology. To a certain extent I agree with one of the leading modern proponents of theism in cosmological philosophy, Richard Swinburne, who is very critical of many-universes hypothesis in cosmology:

“... But to postulate infinitely many worlds in order to save a preferred interpretation of a formula, which is in no way simpler than the alternative explanation ... seems crazy. Many-worlds interpretation is like an enormous inverted pyramid of theory resting on a vertex of observation. ... The postulation of the actual existence of an infinite number of worlds, between them exhausting all the logical possibilities ... is to postulate complexity and non-prearranged coincidence of infinite dimensions beyond rational belief. ... The existence of God is much more likely on the evidence of our life-producing world than the existence of ‘many worlds’.” (Swinburne, 178)

Actually, as I said, in *some* sense I agree with Swinburne, however, I do not think that God has to be conceived as a theistic, personal Lord of Heavens who created the Universe with His free will and divine Providence at the beginning of time. Theism has at least one important alternative, namely *pantheism*. I understand pantheism in a broad sense as a philosophical doctrine and/or religious belief that God, or Deity is *immanent* to the world, to the universe, to nature (*Deus sive natura*), as a teaching of the “divine universal Unity” (Michael Levine). From the metaphysical point of view, pantheism is based on ontological *monism*, which, in comparison with classical theism, enables closer bonds between philosophy and/or theology on the one hand, and science, especially cosmology, on the other. In pantheism, the divine Logos comes close to natural laws that can be teleologically, although not personally, so well chosen and fine-tuned that they yield the existence

of observers at some stage of cosmic history. Pantheism is not necessarily connected with determinism. Generally speaking, there are two main ways of pantheistic teachings. I would call them the “Way of Spinoza” and the “Way of Schelling”. The first one conceives universe as determined in its eternal nature, while for the second one the immanent freedom of nature is essential, freedom that culminates in the living spirit. This second understanding of pantheism, the way of *consciousness* in evolution within nature, might lead to a new paradigm in scientific cosmology (and probably also in physics and other natural sciences). Eventually, the main merit of the modern “anthropic thinking” is the return of problems concerning consciousness to the field of cosmology – this indicates that cosmology cannot be a science of dead stardust spread in the vast empty space. As the ancients used to say: *De te fabula narratur*.

In the end I would like to quote some statements of Paul Davies, one of the most widely known writers on modern cosmology, a philosopher who wavers between theism in pantheism. The following passage, which is a part of his acceptance address upon receiving Tempelton Prize for “progress in religion” in Westminster Abbey (1995), is rather pantheistic:

“So where is God in this story? Not especially in the big bang that starts the universe off, nor meddling fitfully in the physical processes that generate life and consciousness. I would rather say that nature can take care of itself. The idea of God, who is just another force or agency at work in nature, moving atoms here and there in competition with physical forces, is profoundly uninspiring. To me, the true miracle of nature is to be found in the ingenious and unswerving lawfulness of the cosmos, a lawfulness that permits complex order to emerge from chaos, life to emerge from inanimate matter, and consciousness to emerge from life, without the need for the occasional super-natural prod; a lawfulness that produces beings who not only ask great questions of existence, but who, through science and other methods of enquiry, are even beginning to find answers.” (Davies, 315-316)

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