The Aleph Cosmological Principle\textsuperscript{1}

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‘I saw the Aleph from every point and angle,
and in the Aleph I saw the earth and in the earth the Aleph...’

\textit{The Aleph}, Jorge Luis Borges, 1945

Abstract

A general cosmological principle — Aleph — is proposed as a substitute to the Anthropic principle. Furthermore, the universe, conceived as a world ensemble, is characterized by many (possibly infinite) X-Life world principles. The only known X-Life world principle recovers much of the Anthropic conjecture. The inescapable final conclusion is the formulation of the Strong Copernicus principle.

\textsuperscript{1}For more short comments on modern cosmology check at the following address: http://lilith.fisica.ufmg.br/dsoares/notices-e.htm
1 Introduction

The Anthropic cosmological principle (Carter 1974, Barrow & Tipler 1986) has been criticized, and eventually rejected as inadequate by some authors, for being heavily inspired on unproved cosmological models, namely, those known as Hot Big Bang models (Soares 2004a).

Carter presented his Anthropic principle in two versions, weak and strong, whilst Barrow & Tipler described other versions. The great novelty lies in the weak version. The discussion that is done here focuses, therefore, upon the weak version of the principle.

In fact — and it is worth-stressing —, the different versions of the Anthropic Principle are not different versions of the same principle but rather are independent principles by themselves, which is totally opposed to the view expressed mainly by Barrow & Tipler. Such a thesis is further elaborated elsewhere (Soares 2004b).

Towards a broader and unprejudiced view, one can depart from the idea of a universe as a world ensemble (e.g., Carter 1974), except that in a different perspective from what is usually found in the literature, namely, that of a multiverse (see details in Stoeger et al. 2004 and references therein). Let each world vector — i.e., each element in the ensemble —, in fact, belong to the same universe, not being a universe by itself, with its own cosmology, as assumed in the usual world-ensemble approach. That is to say, the total mass-energy content of the universe is given by adding up the mass-energy content of each world vector. Furthermore, each world vector is assumed as potentially suitable for the existence — or development — of life. In other words, the overall conditions in that — and all — world element are such that live organisms are bound to emerge. It is thus characterized by a \(X\)-Life world principle, which simply states that world is as it is because of restrictions imposed by \(X\)-Life being the way it is. These are essentially the same words in Carter’s formulation of his Anthropic principle. Here they are used in the context of a much broader cosmological view as it will be apparent below.

The Anthropic principle has been used in many ways since its proposition. A sort of strange devotion sometimes characterizes those dealing with the principle. This resulted into an exaggerated bending of the bow towards one direction. The situation, comprehensibly, led Soares (2004a) to use irony on the whole issue, in an attempt to bend the bow to the opposite direction,
eventually reaching a state of reasonable equilibrium. That is also the spirit pervading the present essay, except that now with a grave approach.

2 The E-Life world principle

Ours — the only presently applicable X-Life world principle —, conveniently, could be termed E-Life world principle, where ”E” stands obviously for ”Earth”. Since the DNA-molecule is the unifying feature of terrestrial life, the principle is thus stated as constraints derived from DNA-based life upon the world vector properties. Very much so, it is the present general idea pervading the Anthropic principle.

Except for the cosmological implications, much of the conclusions derived from the Anthropic principle (Barrow & Tipler 1986) surely still holds. For example, the prediction by Fred Hoyle concerning the 7.7 MeV excited state of $^{12}$C, which was necessary in order to increase the probability of the reaction between helium and beryllium to produce carbon, might be considered as a genuine E-Life world principle prediction. In 1952, from the evident abundance of carbon — namely, E-Life —, Hoyle predicted the existence of a resonance of $^{12}$C, in nuclear reactions, at around 7.7 MeV, and almost immediately, in 1953, D.N.F. Dunbar, R.F. Pixley, W.A. Wenzel & W. Whaling (1953), at Kellogg Radiation Laboratory, Caltech, discovered a state with the correct properties, at 7.68±0.03 MeV excitation energy. E-Life would not exist without the 7.7-MeV excited state of $^{12}$C. Such a prediction is, of course, often mentioned in classic Anthropic discussions (see Barrow & Tipler, p. 252).

The reason why general cosmological implications are not valid is that a given cosmology must be applied to the whole world ensemble and not to a sole element of it. Aleph is the applicable principle here (see below). Cosmological predictions are always biased when based in a X-Life world principle.

Intelligent life is always an issue whenever one speaks of life. Intelligence, another variable in the general cosmological equation, is not considered in the present discussion. Irrespective of its prevalence, communications between world-ensemble elements, e.g., between a particular X-based organism and a DNA-based one, may or may not be possible. In any case, whether or not two elements of the world ensemble are or may be connected in one or other way — communication being one of them — is entirely irrelevant here.
3 A hypothetical X-Life world principle

Sagan & Salpeter (1976) discuss many aspects of a possible Jovian biology, an investigation motivated mainly by the fact that contemporary Jovian atmosphere has many similarities to the primitive terrestrial atmosphere. They hypothesized the characteristics of Jovian live organisms — in the form of sinkers and floaters, understandable in a gaseous environment — departing from chemical composition, temperature, density, pressure and other known features of the planet atmosphere. Fundamental for the origin of life in Jupiter is the time-scale taken by synthesized complex molecules to move towards large depths, as a result of convective streaming. The time-scale should be short enough to avoid reaching pyrolytic depths, which would severe restrict the possibility of biological evolution.

Now, take the Sagan-Salpeter problem in the reverse order. Assume sinkers and floaters are abundant in the Jovian atmosphere. One may then formulate the J-Life world principle — "J" for "Jupiter". With such a life principle, properties of the Jovian atmosphere might be obtained in the same way E-Life — Anthropic — predictions are made.

Incidentally, Jovian live balloons would be, in principle, totally disconnected from DNA-based terrestrial life. In other words, J-Life world and E-Life world would be disconnected from each other.

I am assuming here that Jovian organisms are not DNA-based, which may not be true. But that does not invalidate the example.

4 Aleph and Copernicus principles

The Aleph Cosmological Principle is the underlying principle to the world ensemble, i.e., to the universe. Predictions about the formation, evolution and structure of the universe — cosmology — are related to the Aleph principle. It is much more general in scope than each X-Life world principle.

Strictly speaking, X-Life world principles do not need intelligent life to hold. In particular, E-Life world principle would still hold even in the absence of mankind, of human beings. This is the essence of what could be termed the Strong Copernicus principle. As long as any sort of DNA-based life do exist, the E-Life principle would still be there. Useless, due to the absence of intelligent life. But still there. The Strong Copernicus principle does not
require the existence of human beings. Man is not central in the universe, it may even not exist. Putting it in another form, amongst all DNA-based forms of life, man is not special. Consciousness makes mankind different — not special — from other E-life organisms, in the sense that mankind is dotted with moral and ethical values. These are fundamental aspects of human life but do not change the biological status of human life. In conclusion, the Strong Copernicus principle is an imperative scientific principle.

The philosophical implications herein are innumerable and will not be treated here.

5 Conclusion

At this point in time there is only one X-Life principle known. Conceivably, the Aleph cosmological principle is a matter of speculation. Conceptually, however, it leads to a broader scenario for the knowledge of the universe we live.

Soares (2001) suggests that the arrow of time is given by the prominence of life, that is, the universe evolves towards life. In an eternal universe, that would lead to the startling conclusion that the universe itself is alive! The Aleph principle is, then, at a certain point, vindicated.

The Aleph cosmological principle is the Aleph-Life principle. It is of course prompted to speculation what is the nature of Aleph-Life, in a way or other, the live universe. Highly speculative matter, on the other hand, scientifically unavoidable.

6 References

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