

Brane Worlds, the Subanthropic Principle and the Undetectability Conjecture

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ABSTRACT

In the recent article ‘Conflict between anthropic reasoning and observation’ (gr-qc/0303070) Ken D. Olum, using some inflation-based ideas and the anthropic premise that we should be typical among all intelligent observers in the Universe, arrives at the puzzling conclusion that ‘we should find ourselves in a large civilization (of galactic size) where most observers should be, while in fact we do not’. In this note we discuss the intriguing possibility whether we could be in fact immersed in a large civilization without being aware of it. Our conclusion is that this possibility cannot be ruled out provided two conditions are met, that we call the Subanthropic Principle and the Undetectability Conjecture. The Subanthropic Principle states that we are not typical among the intelligent observers from the Universe. Typical civilizations of typical galaxies would be hundreds of thousands, or millions, of years more evolved than ours and, consequently, typical intelligent observers would be orders of magnitude more intelligent than us. The Undetectability Conjecture states that, generically, all advanced civilizations camouflage their planets for security reasons, so that no signal of civilization can be detected by external observers, who would only obtain distorted data for disuasion purposes. These conditions predict also a low probability of success for the SETI project. We also argue that it is brane worlds, and not inflation, what dramatically could aggravate the ‘missing-alien’ problem pointed out first in the fifties by Enrico Fermi.

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To the memory of Giordano Bruno

*Innumerable suns exist; innumerable earths revolve
around these suns in a manner similar to the way
the seven planets revolve around our sun.
Living beings inhabit these worlds.*

Giordano Bruno, 1584

1 Preliminaries

Do mountain gorillas know that their ‘civilization’ is embedded in a larger ‘civilization’ corresponding to a much more evolved and intelligent species than themselves? Do they know that they are a protected species inhabiting a natural reserve in a country inside the African continent of planet Earth? The answer to these questions is certainly no, they do not know anything about our social structure, our countries, borders, religions, politics, nor even about our villages and cities, except perhaps for those individuals living in a zoo, or adopted as pets.

In the same way, the human civilization of planet Earth could be immersed in a much larger civilization unknowingly, corresponding to much more evolved and intelligent species than ourselves. After all, the sun is only a young star among thousands of millions of much older stars in our galaxy and the possible existence of such advanced civilizations is only a question of biological evolution doing its job, slowly but relentlessly through the millennia¹. If this happens to be the case it is quite sensible to assume that these individuals regard our planet as a natural reserve, full of animal and vegetal species, the Solar System being nothing but a small ‘province’ inside their vast territory.

In this situation, the answer to the usual remark ‘if there are advanced extraterrestrials around, why they do not contact us openly and officialy and teach us their science and technology?’ seems obvious. Would any country in this planet send an official delegation to the mountain gorilla territory to introduce themselves ‘openly and officially’ to the gorilla authorities? Would they shake hands, make agreements and exchange signatures with the dominant males? About teaching us their science and technology, who would volunteer to teach physics, mathematics and engineering to a bunch of gorillas? In addition one has to take into account the limits of the brain capabilities, independently of the culture or education. For example, let us ask ourselves how many bananas would be necessary for the most intelligent gorillas to understand the Maxwell equations of elec-

¹In addition, as the civilizations would reach some mastery in the field of genetic engineering, the general tendency would be to ‘improve’ themselves, that is their own species, among many others, giving rise to an acceleration of the biological evolution at unimaginable rates. We thank several readers, especially Jim Bogan, for this important suggestion.

tromagnetism (even if they watch TV or listen to the radio). In the same way we may wonder how many sandwiches, potato chips or cigarretes would be necessary for the most intelligent among our scientists to understand the key scientific and technological results of a much more advanced civilization. Our intellectual faculties and habilities are limited by our brain capabilities that are by no means infinite. Therefore it is most natural and sensible to assume that there may exist important key scientific and technological concepts and results whose understanding is completely beyond the brain capabilities of our species, but is within reach of much more evolved and sophisticated brains corresponding to much more advanced civilizations.

The motivation for this idea has been the recent article ‘Conflict between anthropic reasoning and observation’ by Ken D. Olum [?]. In this article the author presents some computations regarding the probabilities that typical intelligent observers belong to a large (galactic size) civilization at the present time. The underlying idea is that in the observable Universe, because of the existence of thousands of billions of stars older than the Sun, there must be huge civilizations much older than ours which could have spread widely through the Universe. (Although not mentioned in [?], Enrico Fermi was probably the first scientist to consider similar arguments, in the fifties, leading to some ‘missing-alien’ problem or paradox².) In particular, using the assumption of an infinite Universe, like in models of eternal inflation, and doing some conservative computations, Olum predicts that ‘*all but one individual in 10^8 belongs to a large civilization*’. Then he invokes the anthropic premise that we are typical individuals and, as a result, he predicts that there is a probability of 10^8 versus 1 that we belong to a large civilization. Dropping the infinite Universe assumption, but keeping still inflation, the author claims that the predictions are not very different than for the previous case. After analysing several possibilities of where the problem might lie the author concludes: ‘*A straightforward application of anthropic reasoning and reasonable assumptions about the capabilities of other civilizations predict that we should be part of a large civilization spanning our galaxy. Although the precise confidence to put in such a prediction depends on one’s assumptions, it is clearly very high. Nevertheless, we do not belong to such a civilization. Thus something should be amiss..... but then what other mistakes are we making.....?*’

In this note we present what we think is the simplest possible solution to Olum’s and Fermi’s ‘missing-alien’ problems and paradoxes. As we will discuss in detail, we could well be part of a large civilization spanning our galaxy (or a large region of it) without being aware of it. Therefore one obviously natural solution is that we do belong to a large, very advanced civilization, but we are not ‘citizens’ of it because of our primitive low status. The two major mistakes of Olum’s, therefore, would have been to assume: first, that we are typical intelligent observers, and, second, that to belong to a civilization implies to be a citizen of it.

²We thank Juan Luis Mañes and Cumrun Vafa for pointing out this fact to us.

Besides, Olum's arguments implying that inflation must *necessarily* aggravate the (very serious) 'missing-alien' problem do not seem very convincing and it is some brane world scenarios [?], in our opinion, what could in fact aggravate dramatically this problem. The reason is the following. If there exist thousands, or millions, of parallel universes separated from ours through extra-dimensions, it would be natural then to expect that some proportion of these universes would have the same laws of physics as ours (presumably half of these would be of matter and the other half of anti-matter), and many of the corresponding advanced civilizations would master the techniques to travel or 'jump' through (at least some of) the extra dimensions. This opens up enormous possibilities regarding the expansion of advanced civilizations simultaneously through several parallel universes with the same laws of physics, resulting in multidimensional empires. It could even happen that the expansion to other parallel galaxies through extra dimensions could be easier, with lower cost, than the expansion inside one's own galaxy³.

In many other universes, however, the laws of physics would be different, corresponding perhaps to different vacua of the 'would be' ultimate Theory of Everything, resulting probably in 'shadow matter' universes with respect to ours. This means that shadow matter would only interact with our matter gravitationally, in the case it would be brought to our Universe using appropriate technology. This does not mean, however, that the shadow universes would be necessarily empty of intelligent beings. If some of them had advanced civilizations, some of their individuals could even 'jump' to our Universe, but not for colonization purposes since they would not even see our planets and stars, which they would pass through almost unaware (they would only notice the gravitational pull towards their centers). And the other way around, we could neither see, nor talk to, the shadow visitors, although they could perhaps try to communicate with the 'would be' intelligent beings of our Universe, through gravitational waves for example. Regarding anti-matter universes, the intelligent anti-observers would not send colonizers either⁴.

We must also point out that in [?] there is a continuous, repeatedly use of the concept 'intelligent observer' without a definition of its meaning. This fact makes difficult to follow Olum's arguments and computations properly. For example, do the Cro-Magnon and Neandertal mankinds qualify as civilizations of intelligent observers? How about the very primitive human beings living nowadays in some forests? Do they qualify? Do they belong to 'the civilization' of planet Earth even if they know very little about it?

For the discussion in next sections we will use the following intuitive definitions:

³The first scientists to consider extra-dimensions and parallel universes were probably Maxwell and Faraday in the 19th century. Outside the scientific realm this idea is many thousands of years old. At present we are still in a very premature phase in the study of brane worlds and we do not know whether these ideas are in fact realistic. Cumrun Vafa thinks that the fact that we do not see aliens around could be the first proof of the existence of brane worlds: all advanced aliens would have emigrated to better parallel universes (our Universe has zero measure) [?].

⁴although they could send unwanted anti-prisoners, their arrival being known as gamma-ray bursts.

Primitive civilizations: Are those civilizations that have a remarkable use of technology in everyday life but are incapable of leaving their planets to colonize other ones in different stellar systems. Their scientific knowledge can have many degrees, ranging from zero to remarkable high levels. In our planet it seems that only the groups of human beings from, approximately, the last 20.000 years qualify as primitive civilizations, corresponding to what anthropologists call the Modern Man, not so the groups of the various versions of the Early Man, who would only qualify as *very primitive civilizations*. We call the individuals of the primitive civilizations *primitive intelligent observers*.

Advanced civilizations: Are those civilizations technologically able to colonize other planets from different stellar systems, ranging from a few planets until thousands of them or more in the case of *very advanced civilizations*. Depending on their technological level they could even travel through extra dimensions (if they exist) and they could visit and colonize planets located in ‘would be’ nearby galaxies in parallel universes. We call the individuals of these civilizations *advanced* and *very advanced intelligent observers*, respectively.

2 The Main Ideas

Let us discuss in detail the possibility that our small terrestrial civilization is embedded in a large civilization unknowingly. This will lead very naturally to the the proposal of two major ideas that we call the ‘Subanthropic Principle’ and the ‘Undetectability Conjecture’.

To start let us come back to the main argument. In our galaxy there are thousands of millions of stars much older than the Sun, many of them thousands of millions of years older, in fact. Therefore, it seems most natural to expect, without the need to invoke inflation, that in a reasonable amount of stellar systems technological civilizations should have appeared, and a fraction of them (even tiny) should have survived enough to spread to, at least, large regions of the galaxy. It is then very remarkable the fact that the Solar System has never been encountered or colonized by any advanced civilization,..... or has it?

In our opinion there is an important flaw in Olum’s (implicit) assumptions about the relations between the different civilizations put into contact in the process of expansion. Although he does not mention this crucial issue, one gets the impression that he believes that the more advanced civilizations will push the less advanced ones to their own level in order to integrate them, or rather they will exploit, damage, or annihilate them in order to conquer the planet, in the case of aggressive colonizers. We fully agree that aggressive advanced civilizations will exploit/damage/annihilate the less advanced civilizations as

much as it is convenient for them. In the case of non-aggressive advanced civilizations, however, the possibility that they will integrate the less advanced ones only makes sense if those ones are not that inferior. That is, if the gap between the two civilizations is not very big, then it is realistic to expect that the superior civilization will push the inferior one to their own level, to some extent at least. In some cases, however, the non-aggressive advanced civilizations will encounter planets with primitive or very primitive civilizations, with an enormous gap (technologically, scientifically and genetically) between them. In particular, the differences between their brain capabilities and those of the primitive individuals could be pathetic. In these circumstances, it is completely unrealistic and naive to expect that the advanced individuals will try to integrate the primitive ones into their own civilizations. They rather will behave ‘ecologically’ towards them, treating them as sort of ‘protected species’ and not interfering (or only very discretely) with their natural evolution.

With this insight it is now much easier to accept the possibility that the Solar System could have been encountered or colonized many thousands, or even millions, years ago by, at least, one non-aggressive advanced civilization, who treated and still treat our planet as some protected natural reserve. As a matter of fact, they could have even brought many plants and animals to planet Earth, including our ancestors, presumably to improve their life conditions (they could have been in danger of extinction in their own planet, for example)⁵. Perhaps the Solar System has been visited by aggressive colonizers, as well as non-aggressive ones, resulting in battles or just pacific negotiations between them. Perhaps the aggressive losers will come back in the future, to try again.

This view about ourselves, a small primitive civilization immersed in a large, advanced civilization, leads straightforwardly to the realization that we could find ourselves not among the typical intelligent observers of our galaxy, but only among a small proportion of primitive intelligent observers instead, completely ignorant of their low status. The typical intelligent observers would be the citizens of the advanced and very advanced civilizations who would ‘own’ the galaxy. But our galaxy is just one typical galaxy from our observable Universe. This leads very naturally to our first proposal:

The Subanthropic Principle: We are not typical among the intelligent observers from the Universe. Typical civilizations of typical galaxies would be hundreds of thousands, or millions, of years more evolved than ours and, consequently, typical intelligent observers would be orders of magnitude more intelligent than us.

⁵One expected activity of advanced civilizations would be the dissemination of life on ‘promising’ planets, in the same way that we plant trees in appropriate environments. In the case life started in this way on planet Earth, then all terrestrial living beings would have common building blocks of DNA with the living beings of thousands of other planets which would have undergone similar insemination procedures with the same bacteria. It is conceivable therefore that, under these circumstances, plants and animals could have been brought to Earth whose extraterrestrial origin would be impossible to detect by any biologist or geneticist.

Observe that the Subanthropic Principle is almost equivalent to the proposal that, at present, all typical galaxies of the Universe are already colonized (or large regions of them) by advanced, or very advanced, civilizations, a small proportion of their individuals belonging to primitive subcivilizations, like ours. Whether the primitive subcivilizations know or ignore their low status will, most likely, depend on the ethical standards of the advanced civilization in which they are immersed. If the standards are low, the individuals of the primitive subcivilizations will be surely abused in many ways, in the same way that in our civilization large groups of human beings abuse other human beings in weaker positions, as well as animals in general. Therefore, in this case the primitive individuals will be painfully aware of their low status. If the ethical standards of the advanced individuals is high instead, then very probably they will respect the natural evolution (biological, social, cultural) of the primitive subcivilizations, treating them ‘ecologically’ as some kind of protected species. In this case, that we think could well describe the situation of the terrestrial civilization, the primitive individuals would be completely unaware of the existence of the large advanced civilization in which they are immersed.

Now there is an important remark: if the Solar System is part of the territory of an advanced civilization, why we do not detect any signal of civilization in any of the solid planets and large satellites in it? It would be most natural if they had built bases all along the Solar System (including underground and submarine bases in planet Earth) and maybe some colonies here and there on, or beneath, the surface of some solid planets and large satellites (this is exactly what we plan to do in the future ourselves!). The simplest answer would be that they do not find the Solar System attractive enough to live themselves and, as a consequence, they have only a few tiny bases difficult to detect. However, independently of whether or not they find the Solar System attractive to build colonies, we believe that all advanced civilizations must be necessarily aware of the existence of *aggressive* advanced civilizations and, as a result, they should have developed very sophisticated camouflage systems, so that no signals of civilization can be detected by any external observers (neither by their space probes). Probably, in many cases they even manipulate and distort the global data of their planets (temperature, air composition, etc.), to fool external observers for disuasion purposes⁶. This is the content of our second proposal:

⁶It may sound strange that advanced civilizations would need to protect themselves against aggressors. However, there is not a single proof or indication that the ethical development of a civilization or an individual, grows in parallel with their level of material well-being or with their technological and scientific development. One may also argue that advanced aggressive civilizations must annihilate themselves, what seems a sensible guess. The crucial issue, however, is not whether they will annihilate themselves but *how much damage* they can produce to other civilizations (primitive as well as advanced) before they annihilate themselves.

The Undetectability Conjecture: Generically, all advanced enough civilizations camouflage their planets for security reasons, so that no signal of civilization can be detected by external observers, who would only obtain distorted data for disuasion purposes.

Observe that, if this conjecture turns out to be true, then we cannot be sure whether the terrestrial civilization is the unique civilization inhabiting the Solar System, as we firmly believe (this statement is independent, in fact, of whether or not our civilization is embedded in a large advanced civilization, we only needed to have ‘advanced neighbors’). In fact, the inconsistency in the scientific reasoning used in the astronomical observations of planets and satellites is remarkable. One uses as input the non-proved assumption that, at the sources, there are no intelligent beings manipulating the data that we receive, and then one concludes that there is no signal of intelligent life, *as the data prove*. But this assumption could turn out to be wrong. The right claim would be in this case that there is no signal of *primitive civilizations*, like ours, who would allow themselves to be detected by external observers, but *nothing* can be said about the possibility of *advanced civilizations*, capable to fool our telescopes, detectors and space probes, and who would not allow themselves to be detected.

Finally, we must mention that the first scholar, at least in western history, who suggested that many stars out there could have planets similar to ours: with plants, animals, people, etc., was Giordano Bruno, in the 16th century. He claimed that the Sun was only one star among the many thousands, and therefore, like the Sun, many other stars would also have planets around and living beings inhabiting them [?]. To appreciate the genius of Giordano Bruno one has to take into account that he lived at the time when more than 99% of the intellectuals believed that the Earth was the center of the Universe, and a few others, like Copernico and Galileo, believed that it was the Sun, instead, the center of the Universe, the stars being some bright heavenly bodies of unknown nature⁷. Nowadays we know that the Universe has no center and that our planet is only a tiny particle of dust in its immensity. In spite of this, for many human beings the Earth is still the center of the Universe, the chosen planet inhabited by the most perfect and intelligent beings all over the Universe: the Crown of the Creation. (There are even regular scientists and ‘intellectuals’ who wonder whether the whole Universe was created just for us, terrestrial human beings, to exist!).

⁷For these and other ideas Giordano Bruno was imprisoned eight years and finally burned at the stake in Rome, in piazza Campo di Fiori, the 17th February 1600. The catholic church, which some years ago apologized for the treatment given to Galileo, has never apologized, however, for the treatment received by Giordano Bruno.

3 Conclusions and Final Remarks

We have discussed the possibility that our civilization could be embedded in a large advanced civilization spanning (at least) a large region of our galaxy. This should be expected, in fact, since in our galaxy there are many thousands of millions of stars much older than the Sun. Using two simple and natural assumptions we see that this possibility cannot be ruled out.

The first assumption explains why the members or citizens of the large civilization would not interact and socialize with us (openly and officially, at least). The reason would be that we do not qualify as full members, neither as associates, nor to be in the queue for applications, although we perhaps qualify as pets or ‘friends’. This situation we generalize, taking into account that we live in a typical galaxy, resulting in the Subanthropic Principle that states that we are not typical among the intelligent observers from the Universe, but much below the standards.

The second assumption, that we call the Undetectability Conjecture, explains why we do not detect any signals of this large civilization in which we would be immersed. The reason would be that, generically, all advanced civilizations are undetectable for security reasons, due to the existence of *aggressive* advanced civilizations. In any case, why would advanced civilizations allow alien civilizations to watch their cities, laboratories, military installations, etc., when they could fool them very easily instead?

The Subanthropic Principle is almost equivalent to the proposal that all the typical galaxies of the Universe are already colonized (or at least large parts of them) by advanced, or very advanced, civilizations, which is a most natural guess taking into account that many thousands of millions of stars which populate the typical galaxies are thousands of millions of years older than the Sun. In these large advanced civilizations there would always exist, generically, a small percentage of individuals which belong to primitive subcivilizations. If the ethical standards of the advanced individuals are low, then the primitive individuals will be abused in many ways (maybe even annihilated). If the ethical standards of the advanced individuals are high instead, then probably they will treat the primitive individuals in an ecological way; that is, like a protected species living in a natural reserve. In this case, which could well describe the situation of our civilization, most of the primitive individuals would completely ignore the existence of the advanced civilization in which they are immersed.

We have also argued that the idea of brane worlds, although still in very premature stage, could in fact aggravate enormously the ‘missing-alien’ problem, pointed out first by Enrico Fermi as was mentioned before. The reason is that, if other parallel universes exist with the same laws of physics than ours, it could happen that advanced civilizations could be technically able to ‘jump’ through the extra dimensions to our galaxy for expansion and colonization purposes. As a result, it could even happen that the ‘owners’

of the Solar System (if they exist) had come from another universe and had created a huge multidimensional empire, with large pieces of territory in several ‘parallel’ galaxies. It could also happen that advanced civilizations would find more efficient (cheaper, energetically preferable) to expand along extra dimensions than inside their own galaxy.

Finally, in the Appendix we discuss the issue of possible contacts and interactions between advanced civilizations or individuals and primitive civilizations or individuals. It seems very unlikely that non-aggressive advanced civilizations would ‘introduce themselves’ to any primitive civilization. Nevertheless, we have identified three major causes or reasons which could motivate individuals of advanced civilizations to seek interactions or relationships with primitive individuals: scientific purposes, entertainment purposes and criminal purposes. We also point out that the Subanthropic Principle and the Undetectability Conjecture predict a rather low probability of success for the SETI project, the reason being the low percentage of technological civilizations susceptible to be detected (the period of detectability of an average civilization could last less than 500 years).

Appendix

In what follows we will discuss the possible sources of contacts and interactions between advanced civilizations or individuals and primitive civilizations or individuals. As we argued in the preliminaries, it is very unlikely that a non-aggressive advanced civilization would contact any primitive civilization ‘openly and officially’ (at least until the latter reaches a remarkable degree of development that our civilization has not reached yet). Aggressive advanced civilizations, however, would ‘introduce themselves’ before, after, or during the strike, for their own convenience. (The fact that our civilization has never been attacked by aggressive aliens, as far as history knows, could be indeed a clue that we belong to a non-aggressive advanced civilization which protects planet Earth, as part of its territory).

If we now consider possible contacts and relationships between individuals of advanced civilizations and primitive individuals, rather than between their civilizations, many more possibilities appear. Trying to identify which advanced individuals could seek interactions or relationships with primitive individuals, and for which reasons, leads us to distinguish three main sources of contacts:

- 1) Scientific research by regular scientists related to life-sciences, such as biologists, medical researchers, anthropologists, sociologists, psychologists, etc. Whether or not the corresponding research activities could damage the primitive individuals (physically or mentally), would depend on the legal regulations of the advanced civilizations regarding ethical treatment towards individuals of primitive civilizations.

- 2) Entertainment, affection, etc. That is, one reason for an individual of an advanced civilization to establish contact with primitive individuals could be simply to have fun

and relax. The advanced individual could have, with respect to the primitive individuals, the kind of feelings that push us to interact and play with cats and dogs and many other species. In addition, if in our planet there are millions of cat-lovers and millions of dog-lovers, and there are even snake, pig, and gorilla-lovers, it is most natural to expect that there may exist some primitive-individual-lovers, in particular terrestrial-human-lovers, among advanced aliens. Why not? This would apply specially to those advanced individuals who must spend long periods of time working in primitive planets, living in underground or submarine boring bases, which surely would exist in our planet in the case that our civilization is embedded in a large civilization (the workers in the bases being the ‘guards’ or militars that take care of the planet).

3) Criminal purposes of all kinds, including activities by regular scientists which would be forbidden by their legal ethical regulations. We can imagine dozens of different criminal purposes for which the primitive individuals could be kidnapped, tortured and even killed, including abject topics such as ‘high gastronomy’ and sadist games. To be realistic, one only has to think of the treatment that some cruel human beings give to their victims, be either other human beings (often children) or animals. The point is that the ethical level of an individual, or a civilization, does not necessarily grow in parallel with their technological and scientific achievements, or with their level of material well-being. In the case that our civilization is embedded in a large civilization, one of the tasks of the ‘guards’ living in the bases would be, undoubtedly, to chase away the human-hunters and other outlaws.

Regarding the SETI - search for extraterrestrial intelligence - project, if the Undetectability Conjecture turns out to be true, then SETI turns into SETPI: search for extraterrestrial *primitive* intelligence. The reason is that, in this case, only primitive civilizations could be detected by external observers. On the other hand, if the Subanthropic Principle is correct, then the primitive civilizations would be very scarce compared to the total amount of technological civilizations, and even more scarce would be the ones with an appropriate technological level to produce electromagnetic emissions to be detected by distant civilizations. (Observe that the period of ‘detectability’ of an average civilization could last less than 500 years). Therefore the probability for one primitive civilization to detect another one would be very small. For these reasons the Subanthropic Principle and the Undetectability Conjecture predict a rather low probability of succes for the SETI project⁸.

⁸Maybe the SETI-experts should join the competition for collaboration: the ‘human antennas’ or ‘alternative-SETI’-experts, who claim to have long-term, well established contacts with alien partners, some of them ‘sitting at home’ in their own planets and some others living temporarily in our planet in underground or submarine basis. The guiness record in such relations is probably held by the spanish ‘grupo Aztlan’, which for around *twenty five years* gather once per week at night to establish (what they claim to be) telepathical communications with a group of sociologists of planet Apu, orbiting Alpha B Centauri, which are sitting at home, or in the office.

A last remark is that we have never done any investigation in the subject of alleged alien contacts. As a result we have essentially no opinion about the true or false alien nature of those circulating through the media. Nevertheless, we believe that it must be an impossible task to identify true alien contacts (if they exist at all) just by reading the reports given to, or written by, their terrestrial partners. The reason is that, for our intuition, the claims of civilizations much more advanced than us must *necessarily* sound ridiculous, hilarious, crazy, science fiction ideas. But the same would have happened if we had described our TV sets, our planes, our microwave ovens, our computers, etcto people only 100 years ago!. Let us also notice that many persons, including many scientists, have a very deep rooted reluctance and aversion to accept the possibility of the existence of extraterrestrial species much more advanced and intelligent than us, who could even visit our planet. We call this prejudice the ‘Crown of the Creation Syndrome’ (CCS), for obvious reasons. Curiously, whereas many religious persons are not CCS sufferers, many atheists are (one reason could well be that they grew in very religious families which implanted in their children’s minds strong impressions of the greatness and uniqueness of the human species)⁹.

To finish, we would like to point out that the present status of the Search for ExtraTerrestrial Intelligence could well be described by the popular american protest-song from the sixties that we transcribe next.

Where have all the aliens gone?

Long time passing....

Where have all the aliens gone?

Long time ago....

Where have all the aliens gone?

Could be hidden everywhere!

When will we ever learn?

When will we ever learn?

(Repeat three times)

⁹In short, the CCS sufferers firmly believe, or secretly hope, that nobody in the whole Universe can do what we cannot do, in particular interstellar travel. Interestingly, they often harbour very high expectations about the future capabilities and great achievements awaiting our civilization. In spite of this, in their reasoning they lack the ability to interchange ‘we’ by ‘they’, and the future by the past, in reference to possible civilizations millions of years older than ours. For example, many of them accept gladly big suggestions of the type ‘we will travel to other planets and stars’, ‘we will colonize the galaxy’, etc. and however, they cannot even listen to the suggestions that ‘they could have travelled to other planets and stars (including the Solar System and the Earth)’, ‘they could have colonized the galaxy’, etc., which are received with sarcasm, disapproval and even anger.

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Note

The first version of this article appeared in August 2003. This date remains on the cover of the present revised version, finished in August 2004, because the article remains essentially the same, except for several minor modifications: four footnotes (1, 5, 8 and 9), one last paragraph in the Appendix and a few small improvements in the redaction. We have translated this article to spanish after we received several requests to do so. The spanish version is also available at physics/0308078. Finally, *Popular Science* is not officially supported by the Spanish Scientific Research Council (CSIC) and should be done therefore as a private activity. For this reason there is no preprint number and affiliation data on the cover of this article.

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