



# Conceptual discussion around the notion of the human being as an inter and multiplanetary species

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## Research Article

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### Abstract

The current advances in our exploration of Mars have made us think of the human species as a multiplanetary species. However, we have certain challenges before we can truly consider ourselves such a species, especially moral ones. Therefore, astrobioethics would be the right one to examine what it takes to consider ourselves a multiplanetary species. The purpose of this paper is to analyse the meaning and significance of being an inter- and multiplanetary species. To achieve this, a philosophical and critical analysis will be made, using as input aspects of biology, ethics and moral community. We conclude that to be a truly multiplanetary species, more than the technological aspects that allow us to reach other planets, a change at different levels will be needed.

As humanity advances in space exploration, it will eventually have to land on another planet, such as Mars, or other moons such as one located in the orbit of Jupiter. However, there is already the idea that we should begin our transformation towards a ‘multiplanetary’ species, with defined plans in this regard (Musk, 2017). We currently have neither the technology nor the resources to colonize Mars or the Moon, but we have to think as if this were a reality already. It is the only way to propose ideas that prepare us for an event with similar characteristics, where, in addition, the biological speciation that will finally form a moral community, will govern the destiny of humanity wherever it may be. Coincidentally, this is the relevance of the word ‘humanity’, since from what is known to date, the human being requires and strictly depends on nature, which in turn becomes a principle to be fulfilled in a mandatory way when man migrates to other celestial bodies. In addition, it is believed that to obtain this degree of harmonious coexistence with nature, a complete reform in evolutionary biology, environmentalism, social economy and evolutionary psychology is required (Seymour, 2016).

In this sense, ‘multiplanetary’ has to be thought not only on the basis of technological advances that allow us to get there, but also on the ethical and social dimensions. What does it mean to be a multiplanetary species? Is it enough to step on Martian soil and make colonies? Is it ethical to expand in the Universe? Are we a planetary, interplanetary or multiplanetary species? This and other questions have to be addressed in order to have a better idea of what we mean by ‘multiplanetary species’ and not leave it as a situation that can be assumed without any repercussions.

Analysing philosopher’s take on the subject, such as Edgar Morin for example, who said that we still live in a Planetary Iron Age, since, despite having better ways of communicating and relating thanks to technology, our mentality is still divided by countries, beliefs and ideologies. Knowing that we all live on the same planet, we do not live or act as such. Globalization is not the same as seeing ourselves as ‘planetary citizens’. There are still many challenges that we have to overcome to legitimize ourselves as a true planetary species (Morin *et al.*, 2006). However, without having overcome these challenges, we are already talking about moving towards being a multiplanetary species.

But not everyone agrees on this, Billings (2017) considers that our expansion in the Universe would be more due to a way of justifying political powers.

Space advocacy can be viewed as a cultural ritual, performed for the purpose of maintaining social order, with its lopsided distribution of power and resources perpetuating the values of those in control of that order – in this case, primarily the military-industrial complex. In short, economic injustice is tied to space colonization proposals (p. 8).

Therefore, your reasoning will be correct, provided that humanity has not achieved the concept of planetary citizen mentioned previously. If we remain in the Planetary Iron Age (Morin and Kern, 1999), of course the fears of repeating the mistakes we made on Earth could occur in other planetary contexts, and no matter how much we travel to Mars or a nearby moon, in

mentality we will continue to be divided citizens, each seeking his own interest and desire. The future and present of human space travel is also one of self-reflection on who we are and how we are.

Therefore, the purpose of this paper is to examine what we understand and what we mean by multiplanetary species. To achieve this, we will divide the study into three parts. The first has to do with the definition from biology, in order to have elements of reflection on being a 'multiplanetary species' and differentiate it from that of 'interplanetary'; the second is about the ethical implications in this regard; and ending in an analysis on the legal aspect. All this reflection is framed within astroethics, which is responsible for studying the ethical implications of astrobiology (Chon-Torres, 2017).

### Biological perspective

It has been doubted on many occasions regarding the uniqueness of life and whether or not it requires strictly necessary conditions for its outbreak, even suggesting an almost overwhelming dispersion of it throughout the Cosmos (Scharf, 2015). Although another position praises the exclusivity and chance of the emergence of life on the planet we inhabit, based on random processes that could only originate in peculiar terrestrial environments (Waltham, 2014).

The first forms of life on Earth were microbial and date back approximately 3.7 billion years ago (Proemse *et al.*, 2017), they arose despite the reducing atmosphere in the Late Archaic (Mata and Bottjer, 2012). These primordial microorganisms that managed to leave evidence of their lithic constructions, today are considered our closest universal common ancestors (LUCA) and it is from them that the three major domains Bacteria, Archaea and Eucarya are born (Forterre *et al.*, 2005).

Much later, the hominization process, which resulted from a common hominoid ancestor to current hominids, took between 5 and 6 million years (Jaiswal, 2007). Today, it is known that our species, *Homo sapiens*, emerged in African territory where it expanded simultaneously along the same continent approximately 300 and 350 thousand years ago and then began the migration process mainly to Eurasia; in this process, speciation began where only the subspecies *Homo sapiens sapiens* survived (Hublin *et al.*, 2017). It is a relatively young but rapidly devastating species that has completely conquered planet Earth. The instinct for supremacy and survival since then, added to the greater organic development of the brain, and with it, a greater degree of consciousness, caused humans to migrate, settle in almost all ecosystems and become uncontrolled territorialists (Sarwer-Foner, 1972). In spite of this, the only home that houses us has been severely damaged and anthropogenically affected, without measuring the more egocentric consequence that would come to be our own well-being on Earth, considerably reducing the life expectancy of all people in the 21st century as a result of climate change (Fang *et al.*, 2013).

However, planet Earth and the humanity it hosts are not only endangered by internal factors such as a possible Third World War, the saturation of the human population on all continents – where other living species are also becoming extinct – or natural phenomena that devastate civilization fortuitously; but also, external factors typical of cosmic space, such as astronomical impacts or the increase in radiation from supernovae that seriously endanger life. Thus, the human species is 'forced' to look for an alternative home where it can guarantee the subsistence of future generations and, now our main attraction due to its excellent qualities, is Mars (Musk, 2017).

Even so, human curiosity encourages us to look beyond the Solar System, looking for and analysing other stars, exoplanets and exomoons with greater features of similarity to Earth, and thus obtains multiple options for space migration when simultaneously discovering or developing vehicles and fuels that move us in an interstellar way (Jones, 2008). Here the importance of the term Planetary Habitability, with the aim of looking for planets and/or natural satellites potentially adaptable to the settlement of life as we know it, using mathematical and astronomical models already established in the correlation of the distance of a planet with respect to its star to achieve the appropriate surface temperature, the formation and maintenance of water in a solid or liquid state and that promotes its cycle satisfactorily, the albedo, among others (Franck *et al.*, 2000; Dobos, 2017).

Now, the human species as such, must urgently undertake projects of greater magnitude if it really wants to have the opportunity in the near future to locate itself in more than one celestial body. First, to emphasize that a planetary species is that part of human civilization that has a purely terrestrial origin and that will remain here permanently; and second, to know that the meanings of the terms 'interplanetary species' and 'multiplanetary species' must be clarified biologically. In this way, it will begin by saying that at present there is no concrete definition of these two expressions, other than what is reflected at first glance: the multiplanetary human species is one that can travel from Earth to another planet or natural satellite to settle there. Authors such as Elon Musk and Camilo Cerro, use the words 'multiplanetary species' in studies that only address the technological (Musk, 2017) and architectural (Cerro, 2017) aspects of space missions to another planet. The words 'interplanetary species' have been used on several occasions by Stephen Hawking, stimulating the migration of the human species to other worlds (Hawking, 2018).

To all this, according to Aldhebani (2018), biologically a species has the following characteristics:

- Individuals must resemble each other.
- There must be gaps in the variations exhibited from one species to another related.
- Each species occupies a definable geographic area (wide or narrow) and is demonstrably established in the environmental conditions it encounters.
- In sexual taxa, individuals should be able to reproduce with little or no loss of fertility and there should be reduced success in crossing with other species (p. 4).

For this reason, the word 'species' cannot be mentioned to refer to humans who will travel to other planets or, who will even be born there. This is because, anatomically and physiologically, humans who travel long periods of time through space and who settle on another planet or natural satellite with different gravities and atmospheres will undoubtedly begin to alter their species phenetically (Stace, 1989; Ridley, 1993). In addition, as a consequence of these organic modifications, the point will come where there is reproductive incompatibility and high gene segregation due to not having geographic limits that favour a single evolutionary line for humans.

So, by replacing the term 'species' only by 'human', since this last word lies immutable; with 'interplanetary humans' we should be referring to people who can travel from one planet and/or moon to another, for example, from Earth to Mars, but with a constant transport dynamic, that is, without a specific interplanetary location. Although the 'multiplanetary humans' would be

those who get to settle on a planet or moon and have external travel restricted forever, future generations born in those colonies would also be called that way.

Therefore, now understanding that the term 'species' cannot be used to refer to future humans who will carry out these missions, the suggestion is to call them 'interplanetary human subspecies' to describe humans with active transport from a planet to another planet and 'multiplanetary human subspecies' to represent humans with restricted transport already established on other planets and their generations destined for the same purpose. It should be noted that the word 'species' as such, must be discarded if it is to be used in that way, especially when the option remains open that at some point humans are genetically modified (Mason, 2019) so that they can cope other extraterrestrial environments or when even in these times we do not know the real consequences of space conditions for genetics, which is in constant change and evolution, unleashing a possible and diverse speciation according to the planet, natural satellite or the time that the human being pass in space transport vehicles.

### Ethical perspective

So far, we can see that there are certain conceptual differences between being a planetary, interplanetary and multiplanetary species. It is our task to differentiate them in order to establish contrasts in the ethical weights that each one has. In Musk's (2017) study, however, all the concepts are mixed in an undifferentiated way.

The alternative is to become a space-bearing civilization and a multiplanetary species, which I hope you would agree is the right way to go. So how do we figure out how to take you to Mars and create a self-sustaining city – a city that is not merely an outpost, but which can become a planet in its own right, allowing us to become a truly multiplanetary species? (p. 46).

In this expression it is understood that a multiplanetary species is one that has managed to leave its home planet and can successfully inhabit another, such as Mars. This coincides with the definition of a multiplanetary species, or rather subspecies. Perhaps it is for marketing reasons to name it 'species' without taking care of biological interpretation, perhaps saying 'subspecies' is less attractive. However, the implications of being multiplanetary appear to be greater than those of merely travelling between planets or being interplanetary. Musk uses the term interplanetary only when he refers to the spaceships that will take care of taking us where we want. Does it mean that only ships are interplanetary while humans are multiplanetary?

If you have all four of these elements, you can go anywhere in the Solar System by planet hopping or moon hopping. By establishing a propellant depot on the asteroid belt or on one of the moons of Jupiter, you can make flights from Mars to Jupiter. In fact, even without a propellant depot at Mars, you can do a flyby of Jupiter (Musk, 2017, p. 61).

Although Musk does not say it directly, interplanetary is understood as that which allows us to travel between planets. Seen this way and extrapolated to the context of the species, we would say that an 'interplanetary species' is one that achieves this type of feat, although it does not necessarily include the ability, since in that case it would be multiplanetary. In both options, the idea of leaving our planet already carries an explicit moral

burden. The decision to leave is related to our survival, whether we are in danger within the next few thousand years or shortly by some event. In any case, it is a matter of life and death, and viewed that way, it is inevitable. The question is how and when. When can be resolved if we assume that our departure is inevitable, so we must do something about it (although this depends more on our technological viability). However, the how is what really concerns us.

With the help of astroethics we generate the idea that if we think of being multiplanetary, we would be exposing native life that may exist and that is found on other planets or moons to great danger. Taking Mars as an example, if we concretize the idea of colonizing it, we should be careful even if life has not been found there until now, since it is a unique scenario and it would be irresponsible to modify it without any justification, just because we are threatened on our planet. We do not want to drag our bad behaviour with the terrestrial ecosystem towards Mars. On the other hand, we have the notion of an interplanetary subspecies, which does not necessarily involve settling and multiplying in the place that has been reached.

Olaf Stapledon (1984) would say about the interplanetary that:

In passing, let us remind ourselves that merely to circumnavigate a planet does not necessarily imply the possibility of landing on it and walking about, let alone staying there and undertaking any sort of survey or industrial operation. ... But let us suppose that mankind has at last become effectively united, both politically and socially. Then what should a united mankind do with the planets? (p. 217).

The interplanetary concept was already handled at that time by this author, and it implied not only the technological capacity of trips to other worlds, but also that we as a society, at a political level in general, are ready. Being interplanetary, and even more so, multiplanetary, implies that we develop the concept of being a planetary species.

Can we be interplanetary without having resolved our situation as planetary citizens? Yes, because the interplanetary is more focused on one aspect of the technological possibility that can take us to other planets. Can you be multiplanetary without having solved the fundamental problems on Earth? Yes, and the future scenario is the fear of repeating the same mistakes of our current planet, taking with us corruption and human decay. What would be the most convenient at a moral and technological level? That we solve, along with what we advance in space sciences and our expansion in it, the essential problems that do not allow us to conceive a more united humanity, considering the complex diversity that inhabits it. Only in this way, we could ethically speak of a 'species', or subspecies, inter or multiplanetary.

From avoiding space junk and thinking about an adequate form of government, being inter or multiplanetary compromises reflections that should not be overlooked by the enthusiasm that implies that we can soon take colonies to Mars. Does the Kardashov scale have something to do with this? Not precisely, on that scale the use of energy that a civilization may have according to its level of development is considered, but the political, social or human importance that this civilization must have to be considered inter or multiplanetary is not mentioned at any time. If it were the case of measuring this circumstance where humanity occupies various space enclosures in our own Solar System, with the current technology we have, we would continue to only take advantage of the energy source of the Sun itself to power the spacecraft (according to the Kardashov scale, we

would fit into type II), with the exception of unmanned probe missions exploring interstellar space where we could be on track to be classified as type III until such time as we get to conquer the entire Galaxy (Kardashov, 1964).

Being aware of the importance of being a planetary species first; what the political, economic, cultural and other aspects imply to be covered; we realize what we cannot call ourselves an inter and multiplanetary subspecies that has internalized astro-bioethics. Perhaps by attending to these needs we can advance more evenly towards our goal, expand in the Universe. Until where? According to Dick (2000), there is a possibility of becoming an interstellar humanity:

In the era of interstellar humanity, the fundamental questions of the species are likely to remain the same as today. Foremost among them are the questions of cosmic purpose and human destiny, issues that were raised in the 20th century in the context of the new biology and the new astronomy, which find their intersection in the discipline variously termed bio astronomy, exobiology and astrobiology – the study of the biological universe (p. 564).

In a more distant future, in the hypothetical case of being able to travel beyond our Solar System, one could speak of the possibility of being an interstellar humanity, and not only that, but also by then astropolitics could have been further developed (Dick, 2000), which today is still in an early stage building its foundations. For this reason we will now discuss the idea of a moral community, which allows us to develop an ethics related to the notion of being a multiplanetary humanity.

### Moral community

So far, we have appreciated both the biological and ethical interpretation. On the biological side, we have observed that speaking of a multiplanetary ‘species’ is not exactly accurate, but rather a subspecies. With regards to ethics, each concept has different moral charges and criteria to develop. We will now discuss how the idea of multi- and interplanetary species could be related to that of a moral community. This is important because it is also an occasion to discuss a possible new speciesism. However, what does a moral community mean?

According to Milligan (2014)

And so, what I am suggesting here is that recognition of a duty to extend human life is above all a way of responding to a special bond to other members of our moral community and not primarily responding to them merely as members of the same biological species. A commitment of this sort, to a sense of moral community, seems to be in play when we criticize the special failures which are often involved in racism, anti-Semitism and similar forms of prejudice.

Therefore, according to the author, a moral community should not necessarily be limited to the biological. If we think of a multiplanetary ‘subspecies’, it would have to think authentically beyond a biologicistic reductionism. Until now, concepts of multiplanetary being were limited to thinking of humanity as the main protagonist. However, if we are to place ourselves in a scenario where we can already perform interplanetary travel and represent humanity, we should think in more astrobiocentric terms, or in other words, in the posture in which our ethical consideration transcends those proper to the human species and considers others as well, the worldview of the Universe based on life in the Universe (Chon-Torres, 2020).

A fundamental part of this astrobiocentric view is also found in Cockell’s (2005a, 2005b) and Cockell *et al.*’s (2011) concept of teloempathy, where empathy for extraterrestrial species is shown. In a hypothetical case of discovering microbial life on Mars, our teloempathic duty should be to care for it because it possesses value in its own right. If we use the concept of teloempathy and that of astrobiocentrism, and we join it to that of moral community, we will have an interesting ethical theoretical framework to justify a multiplanetary ethics.

And the ethics of a moral community would not be limited, then, by genetic issues, but by a shared past and an empathic present. In other words, if we consider the idea of the human being as multiplanetary, the morality on which it is based should be not on the genetic variations that may occur over the years (in which case it would make sense to speak of a species), but on a relationship that can allow an adequate coexistence for all the members belonging to that community.

Of course, if it is the case that the human being is the only species with use of reason and will on a given planet, he must apply the ideas of teloempathy and astrobiocentrism in such a way that he does not expose to danger the local life or that which we are going to transport. This would avoid a type of multiplanetary speciesism. Speciesism gives greater weight to the interests of members of their own species when there is a clash between their interests and the interests of those of other species. Human speciesists do not accept that pain is as bad when it is felt by pigs or mice as when it is felt by humans (Singer, 2011, pp. 50–51).

Let’s say that multi-planetary speciesism would be a drawback, since it could endanger life in other planetary environments, if our motive is none other than to consider ourselves superior just because we are human beings. On planet Earth we have not yet overcome this inconvenience, and the mistreatment of other species is perpetuated, although there is already more awareness about it. And that is why it is important to resolve the planetary issue first (or at least not to leave aside), to avoid repeating the mistakes that we have and will make on Earth. If we venture as inter- or multi-planetary first, without having solved in parallel the essential problems that plague humanity, no matter how far we go, we will remain slaves to our mistakes.

The case of the multi-planetary moral community would have variations if it is the case of sharing space with other intelligent species. In that situation the ethics governing the system would have to be consensual, although this is already a very strong speculation. The most likely thing, for the time being, is to start reflecting on what a multiplanetary moral community should or would have to be. The idea of going beyond one’s own species or one’s own genetics has nothing to do with betraying ourselves as humanity (Milligan, 2014). Rather, it is a sign of maturity as a species to be able to go beyond not only at the planetary level, but also at the species level.

Just as humanity yearns to expand and grow beyond Earth, it must also yearn to grow morally. If it achieves this, it would be a growth not only outward but inward, and as we expand in the Universe, we expand ourselves as persons, transcending selfishness and personalistic inclinations. Thus, a future multiplanetary or interplanetary policy could be oriented from the idea of moral community, since this could determine that planetary coexistence goes from a hopeful reality to a dystopia. Thus, the idea of a moral community is interesting because each community of inhabitants of a planet could have its own moral community. This does not mean that each community disregards the other, but it also gives room for the possibility of establishing an interplanetary moral community, where interactions can take place at the macro level.

Thus, the fact of thinking of being a multiplanetary species also requires the notions of moral community characterized by the planetary environment where they are. For this reason, it would be interesting to further develop this concept also from different disciplines and achieve a more comprehensive and complex notion.

## Conclusions

- (1) From the biological interpretation, there could not be an inter or multiplanetary 'species', since to be a species as such, the genetic and phenotypic characteristics would have to be conserved; furthermore, spatial conditions do not guarantee fertility and reproduction among peers in an appropriate way. In any case, it would be more convenient to speak of a subspecies, in which the inter and multiplanetary terms are distinguished because the first refers to the technological capacity to transport ourselves to other environments outside the Earth, while the second already implies living in these environments by, for example, colonies.
- (2) At an ethical level, the 'inter' aspect of planetary implies a lower moral burden than the 'multi' aspect. The first involves technological aspects of travel to other planets or moons, while the second already involves a direct intervention and modification of the environment, thereby causing possible negative consequences to native life, which is why adequate regulation is required.
- (3) It is important to consider the idea of moral community together with that of teleompathy and astrobiocentrism, since they propose an ethical vision beyond the human species. This is not a sign of betrayal to humanity, but of moral growth that can generate an adequate coexistence for the different species that cohabit a planet. Moreover, not limited to the biological aspect, each planet could have its own moral community, since they would have a common past that characterizes it, responding its *ethos* both to the environment and to the development of its relationships.

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