

# Ecology under the falling sky: Nature, ecology and entropy in Yanomami cosmology

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## Abstract

This article is a theoretical engagement with the book *The Falling Sky*, written by anthropologist Bruce Albert and Yanomami shaman Davi Kopenawa. It presents how the concepts of nature and ecology in Yanomami cosmology, as developed by Kopenawa, break with stereotypes of indigenous people living in harmonic and stable relationships with nature. Instead, this ecology is a way of dealing with an unstable nature that can derail into chaos, disarranging the cosmic arrangement of humans, non-humans and spirits that shamans should work to keep in place. Kopenawa named this cosmic entropy the fall of the sky, which now is an imminent risk caused by the destruction of the forests. His conception of ecology shows that maintaining forests in indigenous land is not merely a spontaneous fact. Rather, it is also a consequence of the intellectual engagement of indigenous people and their collaboration with other living beings.

## Keywords

cosmopolitics, ecology, entropy, indigenous cosmology, nature

*Everyone will be dragged into the same catastrophe, unless it is understood that respect for the other is the condition for the survival of each one. Fighting desperately to preserve his beliefs and rites, the Yanomami shaman thinks he is working for the good of all, including his cruellest enemies. Formulated in the terms of a metaphysics that is not ours, this conception of human solidarity and diversity, and of their mutual implication, impresses with its grandeur. It is emblematic that it falls to one of the last spokespersons of a society on the verge of extinction, like so many others, because of us, to enunciate the principles of a wisdom on which also depends - and we are still very few to understand it - our own survival.*

*Claude Lévi-Strauss on Davi Kopenawa*

## Introduction

This paper is a theoretical engagement with the book *The Falling Sky*, written by Yanomami shaman Davi Kopenawa in collaboration with French anthropologist Bruce Albert. This book is a long and dense elaboration of Yanomami cosmology and a shamanic perspective on capitalism, Western society, the destruction of forests and the genocide of indigenous peoples. Here, I want to treat Kopenawa's work with as much theoretical and conceptual authority as all the European theorists I had to read in my academic training. I recognize myself as an indigenous descent from a Brazilian mixed family of cocoa workers in northeast Brazil, a country that brutally erased the physical, symbolic and intellectual presence of indigenous people. I grew up without information and access to this part of my history. *The Falling Sky* is a book that brings a very singular moment, which is the opening for non-European traditions—or more specifically the Amerindian traditions—to be considered, discussed, and unfolded in the academy. However, I do not consider Kopenawa here as a philosopher, which he neither asked to be nor needs to be to think and lead us to think, but as a shaman, which he is. And the shaman is an indigenous intellectual who comes from a tradition of knowledge not always ignored, but usually subalternized and inferiorized in Western academia. I place myself here in the effort to collaborate in the expansion of a tradition of thought that no longer postpones the urgency of taking seriously the potential alternatives of living and thinking brought by indigenous peoples. Elaborating conceptually from the reading of Kopenawa, I want to affirm the importance of the theoretical contribution of this author to scientific production and philosophical reflection.

My proposal is not merely to explain how indigenous peoples think and much less to entertain a romanticized possibility that we could live as they do. Instead, I am more interested here in how the indigenous perspectives make a reverse anthropology (Wagner, 1981) of Western society, giving back to us an image in which we do not recognize ourselves, but through which we are able to rethink our practices. Viveiros de Castro also called this approach contra-anthropology in his preface to Kopenawa and Albert's book in Portuguese (Viveiros de Castro, 2015). This approach aims to break the racialized hierarchy between an active subject who studies a "primitive" society and the passive subjects who are studied by anthropology. Therefore, what is at stake here is not a search for symmetries between the concepts of European philosophy and the concepts of indigenous cosmology, but rather to understand how much indigenous ethnopolitics and cosmopolitics differ from Western ones. What I seek with this is to achieve discursive shifts from Amerindian traditions to a theoretical and political language that transforms the anthropocentric way that we approach the collective forms of life in Western languages.

Concerning the possibility of Western people understanding indigenous forms of knowledge, this paper is an effort to contribute to this. Indigenous people are struggling intensely to make this communication possible and the book of Kopenawa is proof of this. A book produced by an intellectual from a people of oral tradition. But, we should be cautious to avoid an image of indigenous people as completely apart and distant from what would be officially the "modern society." Nowadays in Brazil, indigenous people are present in the universities, public institutions, health services, arts, and also in the forests! Despite centuries of brutal violence to remove them from their lands. But of course, the distance between indigenous and Western ontologies is evident and this is a different problem—and one of the reasons for this paper. The work of translation is key to inhabit this distance, but meanings are not easily transferable from one language to another. For example, as I hope to show here, the Yanomami word referent to what we call nature means a very different thing—or better to say, a different world—for Yanomami people. To make this communication between indigenous and Western worlds, I am mainly inspired here by the method of *controlled equivocation* developed by Viveiros de Castro (2004), which is oriented to the

comparative analysis of indigenous native concepts and Western concepts. As Viveiros de Castro puts it, the challenge is

[. . .] to contribute to the creation of an analytical language that is tailored to the indigenous worlds, which means an analytical language rooted in the languages that synthetically constitute these worlds. Its elaboration necessarily involves a struggle with the intellectual automatisms of our tradition, and no less, and for the same reasons, with the descriptive and typological paradigms produced by anthropology from other sociocultural contexts. The aim, in short, is a reconstitution of the indigenous conceptual imagination in the terms of our own imagination. In our terms, I say - for we have no others; but, and here is the point, it must be done in a way capable (if all “goes well”) of forcing our imagination, and its terms, to emit entirely other and unheard-of meanings (Viveiros de Castro, 2002: 15, my translation).

Exploring the contrast between indigenous knowledge and Western sciences, I understand the latter is not homogeneous. As a researcher coming from the areas of political philosophy, legal theory and social sciences, this paper was mainly motivated by how these areas ignored the agency of non-human beings in the description of political, legal and social forms, practices, processes and institutions. They also ignored the perspectives of non-European peoples to which these political, legal and social forms were imposed. But this problem goes beyond these disciplinary formations and involves the broader background from which different sciences emerge, either natural or human sciences. This background could be traced to the influence of Christianity, whose cosmology crowns man as the ruler over nature, as told in the book of Genesis. But Christianity is much older than the formation of what became called Western society. Such formation was only possible through the differentiation of itself from other peoples after the meeting—or clash—with these peoples in colonial invasions (Da Silva, 2007). What I am calling Western sciences here are mainly the scientific forms forged by white people in the modern-colonial period and in the territory of what became called Europe. The works of Bruno Latour demonstrated very well how Western modernity separated epistemologically the human world from the natural world (Latour, 1993, 2004). Moreover, this modern separation and the use of natural sciences to improve and intensify industrial and technological production are also inseparable from the exploration of natural sites in the global south, from where the raw materials used to produce merchandise are extracted (see e.g. Crawford and Joler, 2018). The book of Kopenawa discussed here is a strong denouncement and critique of this global network of capitalist production and the forms of mentality that feed and sustain it. The epistemological neutralization of nature as passive and inert matter available to the control and manipulation of humans is an important condition for the objectification and appropriation of other lifeforms in capitalist extraction.

When I talk about capitalism here, I also understand it as always presupposing a global scale. Following the works of Da Silva (2022), Andrews (2022), Bhambra (2021), Williams (1944) and others, there is strong evidence of how colonialism and slavery were the basis for the funding of the first capitalist industries and institutions, as the thesis of Williams (1944) in economic history demonstrates. It still perpetuates in the present and the destruction of forests and violence against indigenous people motivated by the purpose of economic expansion is an ongoing process that did not have an end since the European colonial invasions began. If capitalism is possible in closed systems, this is not the case of that which affected indigenous and black peoples outside of Europe.

With all this said, I move now to the discussion of the book of Kopenawa.

## **The people and the book**

Since white people arrived in South America five centuries ago, indigenous peoples have been resisting a long process of extermination, either because of the direct violence of colonizers,

farmers, miners, and other people interested in exploring their lands or because of the dissemination of diseases brought by these foreigners. From the epidemics of smallpox and measles brought by Portuguese invaders in the sixteenth century to the last pandemic of COVID-19, diseases coming from outside have been one of the main death causes among indigenous people. Moreover, in the last decades in Brazil, they have been facing a harsh struggle against proposals of laws that intend to make impossible the legal demarcation of their lands, as is the case of the proposal of law 490 (PL490). But despite all this situation, indigenous people are not worried only about themselves. Their struggles for their land and the conservation of forests are also moved by a concern about the general livability of the planet. This concern is one of the motivations of the book *The Falling Sky*, written by French anthropologist Bruce Albert and Yanomami shaman Davi Kopenawa.

Yanomami people are an indigenous population who live in the northwest of the Amazon rainforest on the border between Brazil and Venezuela, and they have a population of around 38,000 people.<sup>1</sup> In their intellectual tradition, they have myths that are actualized in their speeches recreating the sense upon reality. The mythological discourse is not static. It is actualized to make possible the apprehension of present experiences. This is the case of the myth about the fall of the sky, which is mobilized by Kopenawa to show how the destruction of forests affects the basis of cosmic order and makes the heavens topple, turning the cosmos into chaos again.

Kopenawa was a key figure in the struggle for the demarcation of Yanomami's territory between the decades of the "80s and 90s." Even after threats were made to his life, he continued to travel to many parts of the world in defense of the Yanomami people's rights. As part of his struggle in defense of indigenous people, and because he was concerned about how deforestation and mining in the Amazon rainforest would affect not only the people living there but also the planet, he decided to publish a book addressed to white people. He thought that since white people did not take the words of the Yanomami people seriously and only believed in "*paper skins*," the term used by Kopenawa for referring to books, then a book would be helpful to spread their message.

In this book, Kopenawa makes a contra-anthropology (Viveiros de Castro, 2015), subverting the usual relation in which indigenous peoples are described by white people in anthropology, and reverting it into a description of white people, "*the people of merchandise*," and their ways of living and thinking, their modes of production and religious believes from the perspective of Yanomami cosmology. The book is structured in three parts that span different problems and are not separate from each other. The first part is more concentrated on the Yanomami cosmology, their understanding of nature and the formation of Kopenawa as a shaman. The second part narrates the inter-ethnic meetings with white people, the violence caused by invaders such as evangelical missionaries and miners, the clash between different spiritualities such as Christianity and Shamanism and the spreading of epidemics triggered by mining. Finally, the third part develops a critique of whiteness, its ways of living in the cities, the capitalist production of merchandise and how it is linked to deforestation, but also how it shaped our minds, producing a "*smoked thought*" anger for the accumulation and unable to get involved with the cosmic richness of nature and its different forms of life.

The three parts of the book interweave with each other composing a long cosmopolitical discourse that tackles the destruction of forests and the inter-ethnic conflicts in their different dimensions and entanglements inside and outside indigenous lands. It is important to highlight the broader dimension of Kopenawa's thought because his conception of ecology is developed in conflict with the capitalist and colonial making of the world and its forms of subjectivation. Concerning the inter-ethnic meetings, Kopenawa not only addresses the racial violence caused by white invaders. Despite these tragic events, he still engages in a diplomatic dialog with white people. His long reflection tells us about the existential risk that the destruction of forests can trigger and summons us all to act in order to avoid the fall of the sky.

The mythic discourse on the fall of the sky is one about the cosmic entropy caused by the predatory activity of non-indigenous people in the forest, such as deforestation and mining. This discourse refers to the derailment of the cosmos into chaos. Entropy is a concept coming from thermodynamics that designates the tendency of a system toward disorder and irreversible processes of change. But as explained by Prigogine (1989), entropy not only designates disorder but also physical processes that engender order. The concept of ecology developed by Kopenawa is an answer to this cosmic disarrangement caused by the destruction of forests. But as I show in this paper, his conception of nature is not characterized by a stable and harmonic whole instead nature is always about to derail into chaos. It is the role of the shaman to maintain the fragile cosmic arrangement and for this, the spirit of the chaos, *Xiwâripo*, is also invoked to contribute. In other words, the shaman is a spiritual thermostat in these societies and the shamanic ecology is also a relation with entropy.

This paper is a theoretical elaboration of the concept of ecology present in Kopenawa's work. The key problem that guides our reading of Davi Kopenawa and Bruce Albert is the concept of *uríhi a*, translated by Albert as *land-forest*, and the comprehension of ecology it brings. Kopenawa thinks of ecology as always intersecting with ethnopolitics, a diplomatic and strategic relationship of alliances with other people. In this case, the white people. Kopenawa uses the Yanomami word *napê pê* when referring to white people, the non-indigenous, inhabitants of cities. It is also necessary to deal with environmental conflicts considering that human lives are never separated from the forms that it is territorially and technically assembled (Latour, 1993, 2007). Here, social conflicts should not be thought of as detached from interspecific relations between humans and non-humans because the different ways of representing nature are central to current political conflicts (Latour, 2004; Stengers, 2015). This is the case mainly in the conflicts around climate change. The political implications of scientific and cosmological disputes over ways of explaining nature turn politics into cosmopolitics (Stengers, 2005). The latter refers to the politics of nature (*cosmos*) in which science, and its practices of describing and explaining nature, becomes a political problem. These conflictual cosmologies emerge from different peoples that also need to create alliances between them, turning it also into an ethnopolitical problem. For example, the differences between Western scientific conceptions of nature that underpin the appropriation, objectification and exploitation of other lifeforms and the traditional knowledge of different indigenous peoples that is never separate from a contrasting ethical relation with nature.

In the following sections, I develop a reflection on the concept of ecology present in the book *The Falling Sky*, showing how it relies on a different understanding of nature and answers to the cosmic entropy triggered by modern society and its violent expansion over indigenous worlds. Although this paper is not enough for this challenging task, I sought to elaborate on some implications from this discussion that point toward other forms of science and politics, or cosmopolitics.

## **The ecology's bodies and the forest's thought**

It is part of Kopenawa's discursive strategy to translate his concepts into white people's languages asymmetrically and comparatively without establishing an equivalence between the different terms and conceptions. As explained by Albert (2002), the political discourse of indigenous leaders is based on a double movement in which the ethnical categories used by white people such as territory, culture, environment, etc. are appropriated by indigenous leaders in their reflection, but reshaped in a cosmological re-elaboration. In this way, these leaders refer to that which white people are describing in anthropological discourse but they do it by mixing the anthropological categories with their mythological discourse and cosmological references. Therefore, the ethnical discourse of anthropologists is legitimated by the cosmological knowledge and this later is reshaped

accordingly to the former. For Albert, this is important because the mere appropriation of white people's categories would turn the indigenous speech into hollow rhetoric, and the sheer cosmological speech would be stuck in cultural solipsism. So, it is the ability to articulate these two dimensions, the ethnical diplomacy with other peoples and the cosmological tradition of their own people, that makes the great inter-ethnic leader. Albert describes it as “a *passage from a 'speculative resistance' (discourse about the other for themselves) to a 'resistant adaptation' (discourse about themselves for the other): from a cosmological discourse on the alterity to a political discourse on the ethnicity*” (Albert, 2002).

Kopenawa does it many times in different moments of his speech. There are two paragraphs in chapter 23 of his book that I would like to focus on here. This chapter is a key moment in my discussion since it is where Kopenawa describes his conceptions of ecology and land-forest—or *urihi a* in the Yanomami language, which is not symmetrically translatable into Christian or Western conceptions of nature as a passive matter. These two concepts of land-forest and ecology have their meanings entangled to each other in such a way that they bring a very different conception of nature.

In this paragraph, Kopenawa presents his conception of ecology:

Since the beginning of time, *Omama* has been the center of what the white people call ecology. It's true! Long before these words existed among them and they started to speak about them so much, they were already in us, though we did not name them in the same way. For the shamans, these have always been words that came from the spirits to defend the forest. If we had books like they do, the white people would see how old these words are! In the forest, we human beings are the “ecology.” But it is equally the *xapiri*, the game, the trees, the rivers, the fish, the sky, the rain, the wind, and the sun! It is everything that came into being in the forest, far from the white people: everything that isn't surrounded by fences yet. The words of “ecology” are our ancient words, those *Omama* gave our ancestors at the beginning of time. The *xapiri* have defended the forest since it first came into being. Our ancestors have never devastated it because they kept the spirits by their side. Is it not still as alive as it has always been? The white people who once ignored all these things are now starting to hear them a little. This is why some of them have invented new words to defend the forest. Now they call themselves “people of the ecology” because they are worried to see their land getting increasingly hot (Albert and Kopenawa, 2013: 393).

Firstly, Kopenawa discusses ecology in contrast to the way in which ecology and nature are often understood by white people. For Kopenawa, the land-forest is never detached neither from the social constitution nor the spiritual experience, as forests are populated by spirits. Ecology appears here as the cosmological composition of the land-forest itself. It is described through the mention of human and non-human bodies that compose the forests. Ecology is the maintenance of the entanglements of these bodies composing that universe. But he also considers ecology as the word that white people created to defend forests, and he welcomes the ecological discourse as it made possible for their words could be considered in the cities.<sup>2</sup> Kopenawa accepts the word but he refuses the concept of environment used in conservation speeches. For Yanomami people, he says, it has a sense of a remaining piece of forest to be delimited, preserved and kept as an exterior dimension of human life. For him, the idea of environmental conservation has to do with what remains of the forest that was hurt by white people and their machines, and the earth cannot be split apart as if the forest were just a leftover part (Albert and Kopenawa, 2013: 397). Kopenawa suggests that nature must be thought of as an entire body that is alive and when we cut it down, intending to protect only some parcels, we turn it sterile.

In a lecture given at the Federal University of Minas Gerais (Brazil), Kopenawa explained another important concept for understanding what Yanomami people mean by nature. He explained what Yanomami people call *hutukara*, which would be that which white people mean by world or



universe. He says that “[. . .] *there is only a hutukara. And we are sat here on the belly of our motherland. The hutukara stays together with the rocks, the land, the sand, the river, the sea, the sun, the rain, and the wind. Hutukara is a body, a body that is united, it cannot stay apart*” (Gomes and Kopenawa, 2016, my translation). In the same lecture, Kopenawa said that the *urihi a*, the land-forest, is the hair of *hutukara*.

In the paragraph below, Kopenawa describes nature in the following way:

In our very old language, what the white people call “nature” is *urihi a*, the forest-land, but also its image, which can only be seen by the shamans and which we call *Urihinari*, the spirit of the forest. It is thanks to this image that the trees are alive. So, what we call the spirit of the forest consists of the innumerable images of the trees, of the leaves that are their hair, and of the vines. It is also those of the game and the fish, the bees, the turtles, the lizards, the worms, and even the *warama aka* snails. The image of the value of growth of the forest we know as *Në roperi* is also what the white people call “nature.” It was created with it and gives it its richness. For us, the *xapiri* are the true owners of “nature,” not human beings. (Albert and Kopenawa, 2013: 388–389)

To understand this paragraph, there is an important point that must be considered in Yanomami cosmology, which is that all beings in the world bring with them a double dimension that is spiritual and which they call *xapiri*. For Kopenawa, what white people mean by nature “*is the forest as well as all the xapiri who live in it*” (Albert and Kopenawa, 2013: 389). He explains that the *xapiri pë* (in plural) are the images of the ancestor spirits (*yarori*, or the ancestor animal) who turned into animals at the beginning of time (Albert and Kopenawa, 2013: 55). These ancestor spirits were all humans that were differentiated into different species; some of them turned into games, others into plants, others into people, and some lost their bodies and were turned into forest spirits. Kopenawa says that “*yet in the beginning of time they (animals) were as human as we are. They are not different. Today we give ourselves the name of ‘humans,’ but we are the same as they are. This is why in their eyes we still belong to their kind*” (Albert and Kopenawa, 2013: 62). Hence, all beings in the world still keep with them a relation to a virtual past when the beings were not individuated into different species; they share a common ground.<sup>3</sup> The *xapiri pë* are the images of these ancestor spirits that appear for shamans in their rituals, dreams and trance, and the shamans are the people able to cross these limits between species and access the perspectives of other beings. As Viveiros de Castro says, the shaman is a cosmopolitical diplomat between different societies (Viveiros de Castro, 2014: 151).

The conception of this common ground shared by all beings in a mythological time is a pertinent point that turns upside down the Western cosmologies in which only specific beings were created as humans, such as in Christian mythology, or became humans through an evolutionary process, such as in evolutionary biology. It has deep implications for the ecological comprehension of the relationship between humans and non-human beings. If non-human beings share with us a common past, if they can also occupy the position of a subject and the category that designates a person in indigenous languages can also be attributed to them (Viveiros de Castro, 2002), therefore the interspecies relationship will also be a relationship between different societies.

Although in a different way, some contemporary discourses on evolutionary biology are bringing up the role of interspecies collaboration—evolution is always co-evolution, a symbiotic *becoming with* (Haraway, 2016; Tsing, 2015)—and showing how other species also partake in the making of the worlds in which we inhabit. However, this still differs from Amerindian perspectives about how other species are endowed with perspectives and play the role of subjects in mythic narratives.

Albert explains that all inhabitants and constituent beings of this “land-forest” are endowed with an essential image that shamans can invoke under the way of auxiliary spirits. These are

spirits liable for the cosmological order of ecological and meteorological phenomena such as the migration of games, the fertility of sylvan plants, and rain control, among other events (Albert, 2002). Albert says that, for the Yanomami people, protecting the forest or demarcating the land does not mean only guaranteeing an indispensable territory for the Yanomami people's existence, but it is above all a way to protect it from the destruction of a web of social coordinates and cosmological exchanges that constitute and ensure their cultural existence (Albert, 2002). For them, "*the forest is wise, its thinking is the same as ours*" (Albert and Kopenawa, 2013: 409). The latter also finds resonance in contemporary scientific studies about the thought and intelligence of plants and forests, for example, the works of botanist Stefano Mancuso (2015) and anthropologist Kohn (2013).

Therefore, we can partially conclude that what Kopenawa calls *urihi a*, the land-forest, is an intelligent complex of beings communicating among themselves, where the position of a subject of perspective is not exclusive of humans and the quality of "humanity" is a continuum among all living beings<sup>4</sup>; in opposition to a concept of nature as passive and inert matter available as a resource to human will. Despite the anthropomorphism of this assertion, when we read Kopenawa's discourse we do not find a formal identification between human and non-human but instead a myriad of diverse beings populating the world. The fact that they share the same substance as humans does not equalize all beings to a certain image of the human, but it breaks with the hierarchy of the human. Indigenous worlds are pluriverses (De La Cadena and Blaser, 2018). This assertion has deep political implications because if all beings are humans, thereafter, they would also demand their political rights and their ownership in a land that should be shared with other species. And we know from our own history how many conflicts arose around the possession of lands and territories. This breaks whatever Edenic image regarding the relationship between indigenous peoples and forests, once that those people are constantly negotiating their position in the forests with other living beings; and it also shows how indigenous cosmopolitics is always a more-than-human politics.

For Isabelle Stengers, cosmopolitics has to do with the practical composition with divergent worlds, and it is a term fully charged with instability and conflict:

"In the term cosmopolitical, cosmos refers to the unknown constituted by these multiple, divergent worlds, and to the articulations of which they could eventually be capable, as opposed to the temptation of a peace intended to be final, ecumenical: a transcendent peace with the power to ask anything that diverges to recognize itself as a purely individual expression of what constitutes the point of convergence of all" (Stengers, 2005).

Considering this, the next section intends to show how the cosmopolitics that we can find in Yanomami cosmology is also conflictive and deals with cosmic instability. It also brings a cosmopolitics that seeks to compose worlds in composition with a plurality of other beings that make the cosmos: humans, non-humans and spirits. This can find a parallel in the cosmopolitics of Andean peoples, as described by Marisol de la Cadena in her paper *Indigenous Cosmopolitics in the Andes*. As she says:

This appearance of indigeneities may inaugurate a different politics, plural not because they are enacted by bodies marked by gender, race, ethnicity, or sexuality demanding rights, or by environmentalists representing nature, but because they bring earth-beings to the political, and force into visibility the antagonism that proscribed their worlds (de la Cadena, 2010).

Moreover, it would have further consequences in our political thought. For example, the conception of nature as a passive matter is the basis for the legal concept of property that conceives



land, forests and animals as appropriable objects by human subjects. This anthropocentric concept of nature is also the basis for the extractivist way of production in capitalist societies, where the land is led to exhaustion, heating, drought, and sterility by monocultures cultivated with intense use of toxic fertilizers and burnings. Such a conception cannot be possible when we relate to forests and lands as cosmological and alive arrangements in which we are also involved, and which are populated by multiple agencies that produce our whole surroundings.

The *urihia* is not an exterior object that should be protected, but the composition itself of existence and its condition of possibility, which must be diplomatically negotiated in a constant relation to other beings and their spirits. Such diplomacy is led by the shamans. This cosmological web of beings should be equilibrated to prevent the cosmos from derailing into an entropic process that would turn it into chaos. So, ecology here has to do with the cosmic composition itself and the maintenance of the entanglement of its components, keeping them together. However, this is not only a secular and indifferent description, for this cosmology is also a form of spirituality and this way of conceiving nature is also a way of living immersed into this cosmological web and its beings; aware and sensible about them, composing our existences together with them, knowing that history is also produced by non-human beings (Fausto, 2002); and, as Donna Haraway says, stitched together with them (Haraway, 2016). This is a practice of avoiding the falling of the sky, which is a catastrophic event that would turn the cosmos into chaos. As Albert says, the mythologies of these indigenous peoples are a narrative knowledge against the entropy, which has mainly been produced by the predatory alterity of white people and capitalism in the last centuries (Albert, 2002).

## **The shamanic entropy against the modern anthropy**

This section intends to show how the concept of nature and ecology in Yanomamy cosmology, as presented by Kopenawa, also implies a different relationship to entropy—as I defined the latter above, the tendency of a system toward disorder and chaos. I explore here some consequences of this in the way we understand the dialog between Western sciences and non-Western forms of knowledge, such as indigenous myths and their forms of describing nature. By considering the contrasts between these forms of knowledge, I also want to break with the presupposed hierarchy between them, in which the latter is always something to be explained and interpreted by the former. Indigenous cosmologies are a form of knowing that is not separated from a form of relationship with that which is known. Therefore, epistemology is not detached from ethics. By discussing entropy through indigenous perspectives, I also want to oppose the stereotype of indigenous people as always living in a peaceful and harmonic relationship with nature.

Above all, it is important to break with whatever misconception that places indigenous peoples in perfect harmony with an idyllic nature, as though they were spontaneous ecologists living in a continuum with that (Albert, 2002). This image of a noble savage just reproduces in the opposite direction the same bias that conceives indigenous people as pre-historical remnants or wild beasts doomed to choose between assimilation to modern societies or extinction (Albert, 2002). We need to break with these false images to make room for their perspectives. Instead of this harmonic and exoticized projection, we can learn from them another way of dealing with the entropy of the cosmos and handling our relations to other living beings in a less utilitarian way.

Maybe we can see that since a long time ago these people have already understood that each cause put into the world triggers a set of new information, which in its turn also signals other possible causes within an endless causal chain impossible to be completely predicted. So, instead of seeing indigenous cosmologies as archaic mythologies, we can see them as holistic systems of integrated causalities; not opposite to science and technics, which are not enough to predict and

reduce all risks, but as a form of knowledge as important as them. The mythological discourse can reinvolve the sciences and technics into a different cosmological sensibility and reorient their coordinates (Hui, 2016).

As the concept of *multinaturalism* shows (Viveiros de Castro, 2014), nature is not a universal and stable set of objects to which we attribute different signifiers and meanings—one nature, many cultures—, but nature itself can differ and be multiple. Precisely because that which we call nature for indigenous people is not a set of objects, but a web of potential subjects. Better to say that nature can differ, we could say that nature is difference, it is a compost of multiple beings producing what we call life. In indigenous worlds, these beings are endowed with perspectives that are taken into consideration in human intervention in other forms of life. The human point of view is not exclusive. In these societies, there is a more symmetrical and diplomatic relationship (the shaman as an interspecific diplomat) between human and non-human communities. It does not mean that there are no conflicts and asymmetries in indigenous worlds, either among humans—gender issues, for example—or between humans and non-humans. But these latter are not completely reduced to mere objects or properties. Their agency and contribution to the maintenance of the *uríhi a* are part of a multispecies collaboration in the making of life. Therefore, techniques were developed here assuming this diplomatic relationship with other forms of life.

Since techniques mediate our intervention on matter and nature, the change of cosmology—our comprehension of nature—also changes the way we intervene in this (Hui, 2016). If nature is not universal, neither is technology. This is the main argument underpinning the concept of *cosmotechnics* of Yuk Hui (Hui, 2016). For him, every technique is a *cosmotechnics* and it emerges from a certain conception of the world and a way of inhabiting it. Every technology presupposes a cosmology. The question concerning technology in the Amazon rainforest is not that indigenous people did not destroy the forests because they did not develop themselves technically, but instead because they developed techniques without conceiving the forest as objects external to their communities. We can take for example how Kopenawa explains the Yanomami agricultural practices working in cycles that avoid the exhaustion of lands. Instead of planting perpetually in the same location, Yanomami people move their plantations to other areas allowing the plants to regenerate (Albert and Kopenawa, 2013: 382–383). We can also consider here the management of chemical properties of plants by indigenous people (Narby, 2021) and their different practices of medicine (Barreto, 2021).

At last, if everything is connected and each being communicates to multiple other beings, the causal relations among them are infinite. The mythological and cosmological speech of indigenous people can be seen as an effort to seize this web of causalities. This would not be opposite to a discourse that intends to formalize and demonstrate all causal relations in more specific ways such as science does. However, it challenges the anthropocentric core of modern science, for instance, in its Christian ground that takes nature as a set of things and sources disposable for human needs, such as narrated in Genesis.

This anthropocentric science was built around a narcissistic subject that does not recognize the ontological and political dignity of other living beings. That science also has in its foundation the Cartesian subject and its form of framing the world that presupposes a radical separation between body and mind, nature and culture (Gebara, 2020). The techniques, machines, institutions and other different social forms developed by this kind of science turned mankind into a geological agent able to modify the planetary thermodynamical conditions. For Lévi-Strauss, “*this same man appears as a machine, maybe more perfected than all others, working for the disintegration of an original order and precipitating in a powerful way an organized matter into an ever-increasing inertia that one day will be definitive*” (Lévi-Strauss, 2011). In the Anthropocene, mankind—the

*Anthropos*—turns into an entropic agent, a producer of chaos and instability, mixing up entropy and *anthropy* (Valentim, 2018).

Kopenawa's book denounces the consequences of this narcissistic perspective of white people that blinds them to the fact that they are not alone on the planet. A key point in his analysis is the critique of merchandise that plays a central role in Kopenawa's contra-anthropology of white people. Valentim observes in his discourse a complicity between the transcendental position of a subject that objectifies everything around him and the capitalist desire for merchandise, as though this transcendental apprehension that converts the world into objects was fundamentally conditioned by the desire for property (Valentim, 2018: 282). Western philosophy seems to work somehow as the capitalist development and every effort to rationally control large projects produces even more entropy. No wonder what comes after the greatest expressions of the modern rationalist project, the works of Kant and Hegel, is the nihilism announced by Nietzsche. In this context of discussion, Valentim quotes the following passage from Kopenawa's discourse:

By wanting to possess all this merchandise, they were seized by a limitless desire. Their thought was filled with smoke and invaded by night. It closed itself to other things. It was with these words of merchandise that the white people started cutting all the trees, mistreating the land, and soiling the watercourses. First they started all over their own forest. Now there are few trees left on their sick land, and they can no longer drink the water of their rivers. This is why they want to do the same thing again where we live. (Albert and Kopenawa, 2013: 327).

Valentim comprehends the Anthropocene as a great transformation in which human activity on the Earth's surface is merged with entropy as a consequence of the identitarian and anthropocentric metaphysics of Western tradition. The latter has produced the split between a world of humans and a world of non-humans, in other words, culture and nature; on the one hand, a world ruled by freedom, while on the other hand, a world ruled by necessary causality. Nature, in this turn, can only be described, predicted, and dominated by the transcendental subject metaphysically isolated and exterior from that natural world (Valentim, 2018). The expansion of the predatory action of this subject over the world, reducing nature to a source of material available to attend to his needs and desires, turned the *Anthropos* into a producer of chaos and cosmic disorder. To name this merge between humanity and entropy, Valentim created the concept of *anthropy* (Valentim, 2018).

In his book *Extramundandade e Sobrenatureza*, without translation into English yet, Valentim does a deep reading of two important Western philosophers, Kant and Heidegger, and demonstrates the anthropocentrism of their thoughts and the links between their philosophical systems and the ecological catastrophe caused by this transcendental subject which was turned into a generator of devastating entropy. However, he found in Yanomami cosmology a conception of entropy while cosmic vitality and radical metamorphosis—*Xiwãripo*, the being of chaos is also the being of metamorphosis—in opposition to that *anthropy* and its cannibal development causative of the cosmic thermal death and the spreading of *xawara* epidemics.<sup>5</sup> Following him, we can find in Kopenawa's thought an *anti-anthropic entropy* (Valentim, 2018). This is not only a non-anthropocentric perspective of entropy, but a form of life sensible to its cosmological entanglement that opposes the *anthropic* devastation of the world caused by capitalist modernization.

It is important to notice that in Yanomami cosmology, the world is constantly unstable and perpetually changing, and the mythological discourse expresses it (look at the quote of Viveiros de Castro in note 4). The myth of the fall of the sky talks about the entropic instability of the cosmos that should be managed all the time by shamans and *xapiri* to avoid its disruption into chaos. Shamanism, far from any harmony with nature, is a way of relating to the entropy and instability of the cosmos. Kopenawa explains it in this passage:

All the beings who live in the forest fear that they could be crushed and wiped out by the sky's immensity, even the *xapiri*! [. . .] They know very well that the sky has fallen before! I know some of this talk about the sky's fall. I heard it from my elders' mouths when I was a child. It was so. At the beginning, the sky was still new and fragile. The forest had barely come into existence and everything there easily returned to chaos. It was inhabited by other people, who were created before us and have since disappeared. It was the beginning of time, during which the ancestors changed into game one after another. And when the sky's center finally collapsed, many of them were hurled into the underworld. [. . .] They still live underground with *Yariporari*, the wind storm being, and *Xiwãripo*, the chaos being. [. . .] The back of this sky that fell in the beginning of time is now the forest where we live and the ground that we walk on. This is why we call the forest *wãro patarima mosi*, the old sky, and the shamans also call it *hutukara*, which is the name of this ancient celestial layer. Later another sky came down and fixed itself above the earth, replacing the one that had collapsed. [. . .] He (*Omama*) asked himself how to consolidate it and put rods of his metal inside it, which he also buried like roots in the ground. This is why this new sky is more solid than the old one and will not come apart so easily. Our shaman elders know all this. As soon as the sky starts to shake and threatens to crack, they instantly send their *xapiri* to reinforce it. Without that, it would have collapsed again long ago! (Albert and Kopenawa, 2013: 130–131).

This passage not only breaks with the misconception that indigenous people in harmonic and spontaneous relationship with forests and other living beings, but it also shows how they comprehend that entropy and instability have always been constitutive of cosmic order. Shamanism is a practice of dealing with that in a non-disruptive way. A sensible practice able to apprehend the affects and signals from other beings and compose human life according to what is perceived from them.

It is worth remembering here the classical work of Claude Lévi-Strauss, *The Savage Mind*, which in its first chapter shows how the indigenous worlds are organized not only by concepts, as a positivist science would do it, but also by percepts, such as mythical reflection are composed (Lévi-Strauss, 1966: 18). Lévi-Strauss demonstrated how their sensitive way of classifying the beings and objects around them can often achieve more specificity than the classifications of natural sciences. Through this, we see a break in the progressive line that placed modern science at a more advanced stage. It makes it possible to perceive other forms of classification and ordering of the world that are not less developed but different. "*Every classification is superior to chaos, and even a classification on the level of sensible properties is a stage towards a rational order [. . .]*" (Lévi-Strauss, 1966: 15). Thus, the mythological way of producing a sense upon reality is no less rational than the scientific one.

An interesting aspect of the book *The Falling Sky* quoted above is how it links the sky to earth as a cosmic entanglement in which the destruction of the latter would also disturb the former. This mythological discourse is used by Kopenawa to denounce how the destructive activity of miners in the Amazon rainforest is a wasting generator of entropy and chaos, as he tells in this passage:

If the white people start tearing the father of metal out of the depths of the ground with their big tractors like giant armadillo spirits, there will soon be nothing left but stones, gravel, and sand. The ground will become more and more fragile and we will all wind up sinking into it. This is what will happen if they reach the place where the chaos being *Xiwãripo* lives, who turned our ancestors into outsiders in the beginning of time. The forest floor, which is not very thick, will start to break apart everywhere. The rain will never stop falling and the waters will begin to rise out of big cracks in the soil. Then many of us will be hurled into the darkness of the underworld, where we will drown in the waters of its big river *Moto uri u*. By digging so far underground, the white people will even tear out the sky's roots, which are also held in place by *Omama*'s metal. The sky will fall apart again, and every last one of us will be annihilated. These thoughts often torment me (Albert and Kopenawa, 2013: 286–287).

Valentim observes that *Xiwãripo* designates not only the chaos being, but also all processes of metamorphosis, changes of form and identity, the loss of mind, being beside oneself, which are always present in life and must be controlled (Valentim, 2018). It is the role of shamans to control the influence of *Xiwãripo* into these different dimensions of life avoiding it to derail in uncontrolled chaos. The shamanic practice is a spiritual thermostat. The ambivalence of this chaos is evinced when Kopenawa says that they also need to call the images of *Xiwãripo* to avoid the fall of the sky (Albert and Kopenawa, 2013).

In this section, I intended to demonstrate how shamanism is a practice of composition with an environment intensively unstable because it is also intensively alive and populated by different non-human agents, either animals, plants or spirits. It is a practice that displaces the human as a sovereign ruler of all beings surrounding him/her. In these shamanic cosmologies, humans need to negotiate their share of the cosmos with all other non-human beings that also take part in its making and maintenance. This would prevent to happen what Gregory Bateson adverts when he said that “*the creature that triumphs over its environment destroys itself*” (Bateson, 1972). By questioning and displacing misconceptions about a harmonic and spontaneous relationship with nature, the shamanic perspective on cosmic entropy shows that the maintenance of forests and their different forms of life is a continuous and demanding practice involving a long tradition of knowledge, involvement with other forms of life and the intellectual engagement of indigenous people. These forms of knowledge are as intellectual as they are corporeal, sensible and affective. They take place not in a distanced objectification of biological and ecological systems, but deeply involved with them. They should not be seen as opposite to the scientific forms of description of nature. However, they oppose forms of description oriented to the objectification, appropriation and devastation of other forms of life. Instead of turning lifeforms into objects, shamanism subjectifies them, inhabiting a world populated by multiple subjects of perspective (Viveiros de Castro, 2014).

## Conclusion

The conception of ecology developed here intended to answer to the ongoing history of the destruction of biomes, the genocide of indigenous people, and natural catastrophe that arises from the colonial invasions of indigenous lands by white peoples, where these latter have been playing for centuries a colonial enterprise of extractivism and predatory ecocide that has modified the geomorphic and geological conditions of the planet. Such transformation has been named Anthropocene by a large part of the scientific community.

The concept of Anthropocene exposes how the inconsequent activity of mankind over the planet's surface has affected planetary thermodynamics to the point that mankind became a geological agent. It brings the urgent challenge of rethinking the way we understand our relation to other living beings and all other non-organic matter that are also conditions for the flourishing of organic life, such as water, air, rocks, minerals and so on (Povinelli, 2016). However, the concept of Anthropocene was also largely criticized for hiding under an abstract and generalized concept of mankind the asymmetries among humans and between different forms of society (Ferdinand, 2019; Moore, 2015). It demands a reflection on ecology that cannot ignore sociological dimensions.

The concept of *urihi a* blurs the distance between ecology and sociology because it says about what we could call nature at the same time it also refers to the forms of life of other people. As Kopenawa says in his book, “*In the forest, we human beings are the “ecology.” But it is equally the xapiri, the game, the trees, the rivers, the fish, the sky, the rain, the wind, and the sun*” (Albert and Kopenawa, 2013: 393). Kopenawa does not defend the forest without defending at the same time a form of human life that cannot be detached from the forest. The same is happening with many other indigenous peoples struggling for their lands in Latin America. Indigenous



ethnopolitics is inseparable from their cosmopolitics. This ethnopolitics also seeks a diplomatic alliance with non-indigenous people who are invoked to struggle in defense of the forest.

In this paper I sought to show that the fact forests still stand up in indigenous land is not because of a lack of techno-economic development of indigenous peoples, but because of a deep, old and long elaboration of knowledge about the forests, and the ecosystems in which they live. I could not elaborate in only one paper and two dozen pages a completely different theoretical system showing how indigenous concepts could help us to reformulate our systems of descriptions of society in relation to nature. This work has been done by thousands of researchers in different countries. But I hope this paper could contribute to asking which societies, which nature and which kind of relation between them? Indigenous ways of knowing the world are inseparable from acting and interacting with and within this world, as all other forms of knowledge are. Otherwise, it would not be necessary to denounce and question how a whole societal configuration based on modern sciences is causing the impoverishment of liveability conditions on this planet.

For sure, we cannot feed an idyllic illusion that we can live just like indigenous people do in our metropolis and contemporary societies, or even outside them. If we try it, we would likely produce hybrids of our habits and necessities reshaped by our ideas of them, turning us not only different from them but different from ourselves. This may be already somehow interesting since our contemporary ways of living and producing are causes for the degradation of our own ways of living and producing. But, better than that, if we take indigenous cosmologies and words seriously, it can crack our understanding of our worlds in such a way that it will be impossible to carry on our ways of living in contemporary societies. Consequently, it demands another production of subjectivity and embodiment able to break with our standard customs, idealized models of economic quality of life, compulsory consumption, etc. To produce another body is not easy and it crosses many constraints, but if we are not able to act upon us by ourselves, it is possible that we can be forced by catastrophic events that will transform our environment and atmosphere in such a way that we will be forced to adapt to very harsh conditions.

One of the main purposes of Kopenawa's book is to show that the forest is beautiful. He strongly questions our attachment and desire for merchandise and technical artifacts that smoke our thoughts to just realize this beauty. But this ecological sensibility is not a mere distanced contemplation but an invitation to get involved with these other forms of life and oppose capitalistic mental and economic monocultures that reduce the biodiversity and the possibilities of living differently from the rush times and tight spaces in which capitalism confines us.

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## Notes

1. This number is according to the information provided by the organization Survival International, an NGO working in defense of indigenous peoples' land rights: <https://www.survivalinternational.org/tribes/yanomami>
2. "My ideas on the forest continued to develop little by little until, much later, I listened to Chico Mendes's words. This is how I learned to know the white people's words about what they call "nature." My thought



became clearer and higher. It spread a lot. I began to understand that it was not enough to protect only the small area where we live. So I decided to speak up to defend the entire forest, including the one human beings do not inhabit and even the white people's land very far beyond us. In our language, all this is *urihi a pree*—the great forest-land. I think it is what the white people call the entire world” (Albert and Kopenawa, 2013: 396).

3. For Viveiros de Castro, it also explains the way mythic discourse works. For him, “*mythic discourse can be defined as first and foremost a record of the process of actualisation of the present state of things out of a virtual pre-cosmological condition endowed with perfect transparency – a ‘chaosmos’ where the bodily and spiritual dimensions of beings did not as yet reciprocally eclipse each other. This pre-cosmos, very far from displaying any ‘indifferentiation’ or ‘originary’ identification between humans and nonhumans, as is usually formulated, is pervaded by an infinite difference, albeit (or because) internal to each persona or agent, in contrast to the finite and external differences constituting the species and qualities of our contemporary world. This explains the regime of ‘metamorphosis’, or qualitative multiplicity, proper to myth: the question of knowing whether the mythic jaguar, to pick an example, is a block of human affects in the shape of a jaguar or a block of feline affects in the shape of a human is in any rigorous sense undecidable, since mythic metamorphosis is an ‘event’ or a heterogenic ‘becoming’ (an intensive superposition of states), not a ‘process’ of ‘change’ (an extensive transposition of homogenic states). The general line traced by mythic discourse describes the lamination of the pre-cosmological flows of indiscernibility as they enter the cosmological process” thereafter, the human and feline dimensions of jaguars (and humans) will function alternately as potential figures and ground to each other (Castro, 2007).*
4. This thesis is sustained by the theory of Amerindian perspectivism developed by the Brazilian anthropologist Eduardo Viveiros de Castro, and it is based on his ethnographic studies with indigenous people in the Amazon rainforest. Regarding this claim, look at chapter 2 of his book *Cannibal Metaphysics*, Univocal Publishing, 2014.
5. Kopenawa links the predatory mining, deforestation and production of commodities to the spreading of epidemics. Although I could not develop this discussion here, you can see it in chapters 15 and 16 of his book with Albert, *The Falling Sky*.

## References

- Albert B (2002) O Ouro Canibal e a Queda do Céu: uma crítica xamânica da economia política da natureza. In: Albert B and Ramos AR (eds) *Pacificando o branco: cosmologias do contato no norte amazônico*. São Paulo: UNESP, pp.239–270.
- Albert B and Kopenawa D (2013) *The Falling Sky: Words of a Yanomami Shaman*. Cambridge: Harvard University Press.
- Andrews K (2022) *The New Age of Empire: How Racism and Colonialism Still Rule the World*. New York, NY: Penguin Random House.
- Barreto JPL (2021) *Kumuã na Kahtiroti-Ukuse: uma “teoria” sobre o corpo e o conhecimento-prático dos especialistas indígenas do Alto Rio Negro*. Doctoral Thesis, Federal University of Amazonas. Available at: <https://tede.ufam.edu.br/handle/tede/8289> (accessed 14 July 2023).
- Bateson G (1972) *Steps to an Ecology of Mind*. Chicago: The University of Chicago Press.
- Bhambra GK (2021) Colonial global economy: Towards a theoretical reorientation of political economy. *Review of International Political Economy* 28(2): 307–322.
- Castro EVD (2007) The Crystal Forest: Notes on the ontology of Amazonian spirits. *Inner Asia Journal* 9(2): 153–172.
- Crawford K and Joler V (2018) Anatomy of an AI System. *Anatomy of an AI System*. Available at: <https://anatomyof.ai/> (accessed 15 July 2023).
- Da Silva DF (2007) *Toward a Global Idea of Race*. Minneapolis, MI: University of Minnesota Press.
- Da Silva DF (2022) *Unpayable Debt*. London: Sternberg Press.
- de la Cadena M (2010) Indigenous cosmopolitics in the Andes: conceptual reflections beyond ‘politics’. *Cultural Anthropology* 25(2): 334–370.

- De La Cadena M and Blaser M (2018) *A World of Many Worlds*. Durham: Duke University Press.
- Fausto C (2002) Faire le mythe. Histoire, récit et transformation en Amazonie. *Journal de la société des américanistes* 88: 69–90.
- Ferdinand M (2019) *Decolonial Ecology: Thinking From the Caribbean Worlds*. Cambridge: Polity Books.
- Gebara MF (2020) Moving beyond human-nature dichotomy: On the cosmopolitics of the Amazon. In: Ioris A, Ioris R and Shubin S (eds) *Frontiers of Development in the Amazon: Riches, Risks and Resistance*. Lanham: Lexington Books, pp.233–258.
- Gomes AMR and Kopenawa D (2016) O Cosmo Segundo os Yanomami: hutukara e urihi. *Revista da Universidade Federal de Minas Gerais*, Belo Horizonte, v. 22, n. 1.2, pp.142–159.
- Haraway D (2016) *Staying With the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press.
- Hui Y (2016) *The Question Concerning Technology in China: An Essay in Cosmotronics*. London: Urbanomic.
- Kohn E (2013) *How Forests Think: Toward an Anthropology Beyond the Human*. Oakland: University of California Press.
- Latour B (1993) *We Have Never Been Modern*, Trans Porter C. Cambridge: Harvard University Press.
- Latour B (2004) *Politics of Nature: How to Bring the Sciences Into Democracy*. Cambridge: Harvard University Press.
- Latour B (2007) *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford: Oxford University Press.
- Lévi-Strauss C (1966) *The Savage Mind*. London: The Garden City Press Limited.
- Lévi-Strauss C (2011) *Tristes Tropiques*. London: Penguin Classics.
- Mancuso S (2015) *Brilliant Green: The Surprising History and Science of Plant Intelligence*. Washington, DC: Island Press.
- Moore J (2015) *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London: Verso Books.
- Narby J (2021) *Plant Teachers: Ayahuasca, Tobacco, and the Pursuit of Knowledge*. Novato: New World Library.
- Povinelli E (2016) *Geontologies: A Requiem to Late Liberalism*. Durham: Duke University Press.
- Prigogine I (1989) What is entropy? *Die Naturwissenschaften* 76: 1–8.
- Stengers I (2005) The cosmopolitical proposal. In: Latour B and Weibel PW (eds) *Making Things Public: Atmospheres of Democracy*. Cambridge: MIT Press, pp.994–1004.
- Stengers I (2015) *In Catastrophic Times: Resisting the Coming Barbarism*. London: Open Humanities Press.
- Tsing A (2015) *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press.
- Valentim MA (2018) *Extramundandidade e Sobrenatureza: Ensaios de Ontologia Infundamental*. Florianópolis: Cultura e Barbárie.
- Viveiros de Castro E (2002) *A Inconstância Da Alma Selvagem e Outros Ensaios de Antropologia*. São Paulo: Cosac & Naify.
- Viveiros de Castro E (2004) Perspectival anthropology and the method of controlled equivocation. *Tipiti* 2(1): 1.
- Viveiros de Castro E (2014) *Cannibal Metaphysics: For a Post-Structural Anthropology*. Minneapolis, MI: Univocal Publishing.
- Viveiros de Castro E (2015) O Recado da Mata. In: Albert B and Kopenawa D (eds) *A Queda Do Céu: Palavras de Um Xamã Yanomami*. São Paulo: Companhia das Letras, pp.11–42.
- Wagner R (1981) *The Invention of Culture*. Chicago, IL: University of Chicago Press.
- Williams E (1944) *Slavery and Capitalism*. Chapel Hill: The University of North Carolina Press.