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Bioethical reflections on life and health in the Amazonian region

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Abstract

This work approaches the complex relationship between humans and the environment, preconizing the vital relationships established by the nature itself to subsist. To that end, exploratory research on environmental bioethics, structured from philosophical fundaments, was carried out. With a systemic point of view, it seeks to build and consolidate, deductively, a practical ethic that stimulates the necessary preservation of the Amazonian region. It designs, then, a narrative literary review, focusing on historical-mythological aspects of Amazon, deforestation and fires, and laws regarding health problems, highlighting the importance of interdisciplinary diagnosis. As a result, it urges the discussion on the impacts of human activities, considering links of prevention and responsibility based on values of goodness, justice, and equilibrium, and keeping in mind that harmony and care are principles inherent to existence itself.

Keywords: Bioethics. Life. Health. Amazonian ecosystem.

Resumo

Reflexões bioéticas sobre vida e saúde na região amazônica

Este trabalho aborda a complexa relação humana com o ambiente, preconizando as relações vitais estabelecidas pela própria natureza para subsistir. Para isso, realiza-se pesquisa exploratória sobre bioética ambiental, estruturada a partir de fundamentos filosóficos. Com uma visão sistêmica, procura-se construir e consolidar, de maneira dedutiva, uma ética prática que estimule a impreterível preservação da região amazônica. Delineia-se, então, uma revisão literária narrativa, com destaque para os aspectos histórico-mitológicos da Amazônia, desmatamento e queimadas, e legislação correlacionada e agravos à saúde, ressaltando a importância do diagnóstico interdisciplinar. Como resultado, incita-se a discussão sobre os impactos das atitudes humanas, considerando os vínculos de prevenção e responsabilidade postulados nos valores de bem, justiça e equilíbrio, e tendo consciência de que a harmonia e o cuidar são princípios inerentes à própria existência.

Palavras-chave: Bioética. Vida. Saúde. Ecossistema amazônico.

Resumen

Reflexiones bioéticas sobre la vida y la salud en la región amazónica

Este trabajo discute la compleja relación entre el ser humano y el medioambiente, preconizando las relaciones vitales establecidas por la propia naturaleza para su persistencia. Para ello, se realiza una investigación exploratoria sobre bioética ambiental a partir de fundamentos filosóficos. Con una mirada sistémica, se propone construir y consolidar deductivamente una ética práctica que impulse la imperativa preservación de la Amazonía. Enseguida, se esboza una revisión literaria narrativa con énfasis en los aspectos histórico-mitológicos de la Amazonía, deforestación e incendios, y la legislación y los problemas de salud correlacionados enfatizando la importancia del diagnóstico interdisciplinario. En los resultados se plantean los impactos de las actitudes humanas teniendo en cuenta los vínculos de prevención y responsabilidad postulados en los valores de bien, justicia y equilibrio, con la concientización de que la armonía y el cuidado son los principios inherentes a la propia existencia.

Palabras clave: Bioética. Vida. Salud. Ecosistema amazónico.

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When thinking about the Amazon, one can reflect on the life present in the dense forest, something that cannot be contemplated simply by vision, touch, hearing or smell. It possesses an ecological relationship that transcends the senses, awakening another kind of perception: that life is more than the sum of its parts. This idea echoes the concept of supersoma—the whole is more than the sum of its parts—, of *gestalt* psychology, developed by psychiatrist Friederich Salomon Perls [1], according to which man is a living organism and some of its aspects are called body, mind, and soul.

For the author, by defining the body as the sum of cells, the mind as the sum of perceptions and thoughts, and the soul as the sum of emotions, even if a "structural integration" is added to each of the three terms, that is, the existence of these total sums as totalities, one may then understand how artificial and incompatible with reality these definitions and divisions are.

Our intention here is not to deepen the theoretical content of *gestalt* psychology, but rather to indicate a meaning inherent to life itself, which points to an "organismic balance," [1] since the metabolic function plus and minus symbolizes the basic activity of every organism, that is, the search for balance [1] and, to this extent, a principle that seeks a harmonic whole.

Austrian philosopher Christian von Ehrenfels, who was at the forefront of *gestalt* psychology, referring precisely to harmony, considered that melody, despite being constituted by individual sounds, is more than the sum of notes [2]. In this regard, the philosopher points out the relational value of existence, which leads us to believe that the relations established between living beings comprise something beyond the observable. Relation means the intrinsic ordering of something towards another, configuring what philosophy defines as *ordo ad aliquid* [3].

Ethics is defined precisely through the concept of relationship, highlighting the principle of balance and justice. According to Jacques and collaborators [3], the assertion that ethics is justice becomes clear when thinking about the meaning of justice (from the Latin *jus*, meaning "right"). Therefore, one is just when establishing fair relationships with another. For Dussel [4], it is in the recognition of this otherness, that is, the awareness that the other exists, that the whole ethic of existence resides.

Ethics and justice have been reconciled since classical Greek antiquity. In *Ethics to Nicomacheus*, Aristotle establishes this relationship based on the concept of virtue, according to which *the function of a good man is a good and noble realization of the same* actions of the soul that imply a rational principle; *and if any action is well performed when it is in accordance with the excellence that is proper to it; if indeed it is so, the good of man appears to us as an activity of the soul in consonance with virtue, and, if there is more than one virtue, with the best and most complete* [5].

Virtue is, therefore, the virtuous action, the relationship established with another being through a good and noble realization. It follows that man, in acting virtuously, is just, inasmuch as justice, for the Greek philosopher, is a complete virtue not in absolute, but in relation to the other [5]. By integrating the notion of virtue and justice, the philosopher presents the path to the true purpose (*telos*) of human life that is realized in happiness: *the happy man lives well and acts well* [6].

This set of ideas elucidates the main focus of the research: to consolidate a conceptual structure that justifies the identification between life and the indispensable act of preserving it, an idea that echoes ties to bioethics, that is, the link between ethics and life, which is established in the virtuous relationship of good and justice.

In V. R. Potter's *Bioethics: bridge to the future* [7], the metaphor of the "bridge" anticipates the concept of bioethics itself: bioethics as a link, as an ethical relationship that is established with life and, consequently, as a "bridge to the future," that is, as knowledge that contributes to social good. Bioethics therefore reveals a way of being.

As Pessini [8] points out, Paul Max Fritz Jahr, in coining the term "bioethics" in his 1927 article "Bioethics: a review of the ethical relationship of humans in relation to animals and plants," highlighted bioethics as a relational aspect that is established between man and nature, revisiting the concept of imperative from Kantian philosophy, which would be consolidated in the idea of bioethical imperative. According to Pessini [8], this latter concept spread Kant's moral imperative among all forms of life, according to which one

must act considering humanity itself and that of others, always as an end and never just as a means, that is, all living beings must be respected and treated as a principle and an end in themselves.

Such consideration suggests that the relationship between man and life is centered on the bioethical imperative; between man and life there is a dialogue of reciprocity that is necessarily based on the principles of respect, balance, virtue and justice. Bioethics, therefore, is extolled by the dialogue created between diverse traditions of thought.

This dialogue requires a series of values (mutual respect, tolerance and civility) and an openness to changing one's own perspectives based on empirical facts and the persuasion of others. Such virtues belong not only to Western discourse, but also to the global discourse [9]. It is precisely from this reflection, in which the concepts of relationship, virtue and dialogue stand out, that stem the contemporary philosophical problematizations related to bioethics, and more specifically that of environmental bioethics.

By means of an exploratory research about the emerging concept of environmental bioethics, we unveiled peculiarities of existence that, when perceived, engender in the human being the understanding of a mirroring relationship between man and the environment, what it entails, in terms of implication, and encompasses, in terms of meaning. Here, we emphasize that human attitudes must be examined from the principle of responsibility towards a practical ethics, that is, the unification between life and ethics, from which a harmony is created: the foundation and goal of the very being that naturally tends towards an organismic balance, a symbiosis based on the natural sense of protection, love of life and prevention of the future, through the unavoidable act of preservation, which focuses on the Amazon region.

Historical and mythological peculiarities of Amazonian life

Amazon's current territorial configuration was directly influenced the by settlement process undertaken by European colonizers between the 16th and 19th centuries, involving conflicts with the various indigenous peoples and disputes between the colonizing countries—Spain, Portugal, England, the Netherlands and France [10]. At that time, most of the Amazonian territory was occupied by Spain and Portugal. From the *Treaty of Tordesillas* (1494) until the last treaties, around 1777, the general lines of the Amazon began to be defined, which continued in conflict in the region [11].

As for the delimitation of internal borders—understood here as the expansion front of a society in its own territory, and not as the boundaries between national states or their possessions [10]—, in the decades following Brazil's Independence (1822), the Amazon maintained totally occupied areas, as in the case of Belém, and others totally abandoned, predominantly unknown areas [10].

Thanks to foreign investment, the region saw an intense latex exploitation throughout the 19th century, bringing major changes to the Amazon regarding the industry and urban development. Manaus and Belém were its epicenter, with the former ceasing to be a simple village and the latter being one of the first cities in Brazil to receive electricity and piped water [10].

Starting from the 20th century, the occupation of the Amazon occurred at a more intense pace, highlighting the environmental damage caused by extractive action [10]. This historical evolution of the Amazon points to a region that developed socially and culturally from the exploitation of natural resources.

Interestingly, the region was named "Amazon" at the beginning of colonization. As Pereira [11] points out, the denomination originated when Spanish colonizer Francisco de Orellana descended the Amazon River in 1539, then called the Murañon River, towards the Atlantic Ocean, in search of the El Dorado. According to the author, on the way, in the year 1541, near where the city of Óbidos/AM is located today, Dominican priest Gaspar de Carvalhal, chronicler of Orellana's journey, narrates how his entourage had been expelled by the Icamiabas (a Tupi word that can be translated as "women without men" or "women who ignore the law"). The Spaniard, inspired by these women, named the traveled river Amazon, alluding to the Greek mythos of the Amazons, warriors descended from Ares and the nymph Harmonia, gods of war [11].

According to local tradition and reports reproduced by Ary Pinheiro [12] in his book *Viver amazônico*, on the banks of the Nhamundá River lived a tribe of female warriors who did not admit men among them. Legend says that, once a year, the icamiabas (*ikam my ABA*—women who had no breasts) welcomed famous and beautiful men from neighboring tribes and lived with them for one night. After the communion, they left and returned only the following year, receiving, as a souvenir, a sacred amulet called Muiraquitã. If the children born from this encounter between the Icamiabas and indigenous men were boys, they were killed or given to their fathers, while the girls were welcomed by the tribe and, after reaching puberty, atrophied their right breast with fire to better handle the spear and the bow and arrow.

Embodied with great virtues, the Muiraquitã amulet is a living being. To attain this amulet, at the lake "Yacy-Uaruá," the Icamiabas had to injure themselves and then spill their blood on a living being so that it would become the Muiraquitã. Usually shaped as a small frog, the amulet can also be found with the appearance of a turtle or other animal. Interestingly, the Muiraquitã is always zoomorphically related to water, as the *perereca* (frog), according to indigenous belief, is the guardian of rainwater, bringer of rains [13].

Conversely, the name may have evolved from a Tupi word used to describe the river: *amassona*, "the river that breaks canoes," was the place where the Spaniards faced between ten and 12 of these women warriors [14].

Greek mythology allows us to establish a peculiar link between the Amazons, the concept of harmony, and the context of constant litigation in the Amazon region. Among the Greek goddesses, Harmony was considered the mother of the amazons, and Ares, the god of war, their father—this is the relation Francisco de Orellana had in mind when he equated the concept of the amazons to the region. From this perspective, the name "Amazon" intrinsically relates the region's creation to the connection between war (or conflicts) and harmony, in which the Amazons ultimately "acclaim" the mother, "harmony," to ensure the balance of their own nature.

In conclusion, minimizing the exploitation of natural resources in the Amazon requires conflict management based on harmony indicators and the creation of an ecological subject.

Ecological relationship, ecosystem and ecological subject

In ecology, an organism is a living being that is a member of the same species; the group of each species is defined as a population. A community consists of several sets of populations that occupy a *habitat* [15]. When dealing with organism or individual, ecology implies several classes: humans, plants, animals and even the microbiota. We thus arrive at the term "ecosystem," that is, the set of all classes of individuals plus abiotic factors [15]. Given our focus on the relationship established between man and nature, it is essential to discuss how one affects the other regarding the ecological relationship [16].

Throughout time, humanity has sought to, solely and exclusively, satisfy its own interests, disregarding all that is sacrificed for this, in contrastopposition to the bioethical imperative. In response to consumerist practices, environmental studies have been introduced in the social environment to encourage the idea of an ecological subject, used since the early 2000s to identify a broad set of ecologically oriented dispositions. Defining a place of subjective and objective constitution of beliefs, values and behaviors [16], the term "ecological subject," according to Stell and Carvalho [16], refers to a social sphere marked by environmental concern. As a socially legitimate arena, it acquires a potency capable of engendering identification processes, ethical, aesthetic, and moral values and beliefs, introducing an imaginative horizon. For the authors, *the ecological imagination crosses social life as a creative potency, redefining the landscape we inhabit and our relations with other organisms and objects that form the same world in which we exist* [16].

In contemporary social psychology, the concept of ecological subject also determines a specific way of being in the world that places the individual before himself and others, a way of

describing ideals capable of inspiring ecologically oriented attitudes [17].

The ecological subject awakens in the human being reflections concerning their attitudes and lack of discipline when it comes to the ecosystem and its exploitation. As the greatest source of protection for ecological balance in the Amazon, bioethics unveils actions that undermine the environment, namely, the notion that man has shown a lack of self-sufficiency and evaluative skills.

According to Fischer and collaborators [18], Heidegger showed how the excessive use of technology broke with any idea of limit for the human being, based on the premise that everything one can think of must be put into practice. Although the ecological subject represents the first and greatest step in defense of dignity and respect for nature, we must broaden reflection so that it is not understood in isolation, but rather interdependent of social, cultural, spiritual, economic, political, and moral issues [18].

Another key factor for this systemic view is the understanding that human behaviors have significantly impacted climate change and, consequently, contributed to the environment and health imbalance of the Amazon.

Climate and resilience

When thinking about the countless riches the Amazon can offer—a climate suitable for livestock and crop production, exotic fauna and flora, and its function as a "green lung"—, the regions can be considered a "pot of gold." Therefore, its development and integration require *cutting-edge science and technology, and this time with an eye to it and not to outside interests. These conditions are now possible thanks to the scientific-technological revolution that, from the 1970s, generated a new form of production based on information and knowledge as productivity sources, associated with a new form of social and political organization. The Amazonian nature, in this context, undergoes a double revaluation: as natural capital—scarce economic resource and source of knowledge, and as condition for the survival of the planet* [19].

Environmental studies have presented preventive and remedial measures to recover the planet, thus demonstrating that the idea of an ecological subject has had the desired effect on society. Among the various measures proposed is the Kyoto Protocol [20], which allows the purchase of carbon credit, making the equivalence of polluting gas emissions that have implications for global warming.

As Ribeiro [21]points out, global warming was confirmed following the 1992 United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro. In response, during the Convention on Climate Change the United States, supported by several Arab oil-producing countries, demanded the adoption of a generic text, since its final wording was sufficiently vague to be unanimously accepted by UNCED participants. Consequently, countries with greater greenhouse gases emissions (mainly carbon dioxide, methane, chlorofluorocarbon and nitrogen oxide) were included under Annex 1 and undertook to maintaining the 1990 volume of emissions starting in the year 2000.

Despite the relevant ideas for planet resilience brought by changes in ecological thinking, preventing is better than remedying, especially in the case of the Amazon region, since its biodiversity is essential for the balance of the ecosystem, as well as all the cultural richness that makes up Amazonian history. One lives in a community, in an ecosystem, where relationship and collaboration preserve balance, essential to survival.

Deforestation, wildfires, their effects and counter policies

Currently, the Amazon represents a series of conflicts of interest, especially regarding the ecological issue and the need to ensure the survival of local peoples. As for the ecological issue, according to Homma [22], the contextualization of the Amazon meets a common characteristic of Earth's inhabitants: the search for a more rational use of natural resources, considering the interests of developed countries and the exoticisms of certain ecological movements [22].

In this regard, one must think of the human being as having the right to enjoy natural resources, but without ignoring their preservation, thinking about future generations.

Debates around preservation have garnered greater depth due to the growing concerns regarding climate change and its effect on global wealth. This has raised questions pertinent to bioethics and Environmental Law; after all, does nature itself have its own intrinsic rights or should it be preserved only from the point of view of human fulfillment?

Encompassing the largest biodiversity in the world, the three-dimensional structure of the forest, with very diverse microenvironments, allows for the creation of various niches which accommodate very distinct species. For example, the Amazon rainforest accounts for numerous endemic species (plants and animals). Recognizing this enormous variety of life forms in the Amazon, it is imperative that they are preserved [23]. Following road constructions and the emergence of cities, the Amazon region started experiencesaw the emergence of new means of economic exploitation: the formation of latifundia for cattle raising, the mechanization of agriculture, and the development of hardwood exploitation.

Deforestation and wildfires, which harm fauna and flora, have made it essential to implement counter policies aimed at protecting the Amazon's natural heritage. In this regard, Brazil suffers great international pressure to control the high deforestation rates, which also contribute to global warming and directly affect the region's climate, increasing dry seasons [24].

To encourage preservation, the Federal Government enacted Law 12,187/2009 [25] in December 2009, thereby instituting the National Policy on Climate Change (PNMC), in which the country voluntarily undertakes to reduce its anthropogenic greenhouse emissions between 36.1% and 38.9% until 2020. It also emphasized the implementation of sectoral plans to combat deforestation, such as the Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) and the Plan for Action and Control of Deforestation and Fires in the Cerrado (PPCerrado). According to the rate of the Project for Monitoring Deforestation in the Legal Amazon by Satellite (PRODES), of the National Institute for Space Research (INPE) [26], such measures resulted in a significant drop in deforestation from 2008 to 2012.

Instituted by Law 12,651 [27] of 2012, the new Forest Code, responsible for regulating the use of rural properties in Brazil, consolidated deforested areas until 2008 and reduced preservation and conservation areas of natural resources. This resulted in increased deforestation rates starting in 2012, culminating in 20% between 2020 and 2021, according to the PRODES rate for the Legal Amazon, published by INPE [26]. One possible reason for this scenario was the sense of impunity brought by the new forestry laws; after all, specialists heavily criticized the amnesty granted to those who had deforested up to 2008. These conditions threaten the country's possibility of reducing greenhouse gases, since the loss of forest cover aggravates their emission [24].

Beyond the issues inherent to deforestation, wildfires also feature in the set of problems that hinder the preservation of the Amazon. It is the least expensive procedure in soil preparation compared to other methods, such as the removal of biomass (trunks and branches), and constitutes a traditional practice in the Amazon countryside, since fire removes unpalatable vegetables, stimulates pasture growth, controls pests, establishes protection mechanisms against fire entering areas that are not intended to be burned, and protects against accidental fires. Fires also promote free fertilization in terms of various nutrients, especially potassium [22].

Achieving "zero deforestation," as the Brazilian environmental policy and developed countries aim for, without offering economic and technological alternatives, would lead to unemployment, increased rural-urban migration, the slumming of urban centers in the Amazon, lack of sanitation, higher crime rates, etc. Until this occurs, the planned burning of dense forest and grasslands by small farmers should be part of Brazilian environmental policy [22].

Measures capable of contributing to reduce the annual deforestation and wildfire rates in the Amazon depend, among other factors, on fiscal policies and technologies adapted to the socioeconomic conditions of rural producers. On the one hand, we have low-cost technologies that seek to reduce the recovery time of poultry houses and, consequently, increase the volume of biomass, highlighting the introduction of green or dead coverage and the manufacture of organic

compounds. On the other, expensive technologies responsible for the mechanization of cultivated areas via modern inputs [22].

In short, property zoning to intensify land use, accompanied by fiscal policies and market mechanisms, would bring greater conditions for success in the protection of Amazonian forest resources. Deforestation and wildfires are not solely physical phenomena; they refer to social aspects that require adequate fiscal policies [22].

Society is permeated with anthropocentric ideals, according to which the defense of nature, including plants and animals, is beneficial only to the extent which these beings serve human interests. The concept of bioethics, however, reveals the limitations of this utilitarian logic by arguing that the value of nature and life should never be attributed exclusively to a productive or utility aspect.

Such assumptions clearly point to the need to promote a more contemplative view of the Amazon's fauna and flora, which in turn encompass the concept of biophilia. For many, this love for nature and living beings is innate and sustained by the experiences and interactions with the environment in which they live, however, environmental education is an essential ally to awaken an appreciation for nature and sustain this interest.

Hence, the current problems concerning the Amazon region have a direct and unquestionable effect on the life and health of living beings belonging to this ecosystem, requiring debates around environmental preservation and education to foster a more critical and responsible collective consciousness regarding actions that hurt the fundamental balance of the Amazon. Finally, we must not forget the health of nature's organisms and, consequently, public health.

Occurrences and aggravations of fires in social life

> *What is most just is noblest, health is best; pleasantest is to get your heart's desire* [28].

Today's increase in life expectancy and survival of individuals affected by chronic and/or degenerative diseases worldwide, thanks to the medical and technological advances of the last three decades, have put bioethics at the center of discussions on issues of humanization and total well-being in interpersonal relationships and care. Diseases that were once considered brutally lethal are now subject to treatments and interventions that significantly prolong the lives of patients, prompting discussion and reflection on the legitimacy and even on the cost of this prolongation of life. Consequently, health professionals need a greater understanding of health care and the dimensions of death, pain and suffering. According to Pessini [8], in today's society, especially in medicine, the end-of-life care has become a major issue.

Elio Sgreccia's [29] personalist bioethical model stands out among the proposals for an in-depth look at life, based on the person in their human unity, that is, made up of body and soul. This dimension values the elementary experience, the knowledge of one's own experience: an integral conception of the subject, who refuses ideological, partial, and contingent proposals and seeks to promote the defense of the whole good of the person [24].

We understand that health depends on an ecological scenario, the society-nature relationship, the technological basis of work processes, and the material living conditions. Living conditions refer to the standard of citizenship: access to housing, education, employment/salary, and consumption profile [30].

These issues are associated with the way society organizes itself to exploit its renewable and non-renewable natural resources: whether it exploits them predatorily or preserving the environment; whether the productive base of society uses polluting or clean technologies. These choices would imply two options—either a healthy or a polluted environment—and both would condition the quality of life of populations, determining new lifestyles [30].

Health studies focusing on the Amazon should remember to adapt the Anglo-Saxon epidemiology models to the complex health-disease process and to the geographical, historical, cultural, and environmental particularities of the region [30]. The health and disease conditions of a given society result from a complex network of relationships in which population and environment are inserted.

The living, environmental, and working conditions to which people and social groups are subjected are therefore relevant to the health-disease process. Any changes in such conditions may alter the health framework [31].

Scholars worldwide have shown great interest in studying the effects of air pollution on human health. Research shows that more susceptible groups, such as children under 5 years of age and individuals over 65, presented a continuous increase in respiratory and cardiovascular diseases, and in general and specific mortality associated with exposure to air pollutants [31].

Genetic, gestational, nutritional, and environmental issues are some of the factors involved in the onset of respiratory diseases [32,33]. In the most vulnerable groups, air pollution resulting from biomass burning has greatly impacted respiratory health [32,34].

Smoke from combustion can cause death or serious injury, such as respiratory tract injury, asphyxiation, and direct irritation of the lung tree. Airway edema and hypoxemia are the main causes of death. After 12 to 36 hours of smoke exposure, patients begin to develop symptoms related to chemical airway irritation [35]. In patients with severe intoxication, administration of 100% oxygen at high pressures may be indicated to help displace carbon monoxide from hemoglobin. If case of severe injury to the tracheobronchial tree, the necrotic tissues will begin to loosen in three or four days, and the increased secretions and accumulation of dead tissue put the patient at high risk [35].

Acute respiratory distress syndrome (ARDS) can appear several days after smoke exposure, resulting from intense inflammatory activity in the lungs, with large fluid leakage into the airways and acute respiratory failure. Delayed adequate treatment and prolonged hypoxemia in patients may cause neurological lesions due to poor cerebral oxygenation [35].

Current clearance techniques include autogenic drainage, active breathing cycle, expiratory flow acceleration (EFA), combination of devices such as the positive expiratory pressure (PEP) system and the Flutter or Shaker (oscillatory positive pressure). Techniques like EFA are contraindicated for emphysema because they stimulate bronchial smooth muscle and cause bronchospasm [36].

Formed by the interaction between society and ecosystem, the Amazon region, from an epidemiological perspective, is differentiated both by its natural ecological base and by its formation structure based on occupation and exploitation. From this background, the results are easily determined: the human being will suffer or benefit according to their choices and interactions with nature [37].

Final considerations

To speak of bioethics is to speak of the principles inherent to one's own existence, that is, about practical ethics and all that it involves, opening the discussion to the following questions: If we consider life as an ethics-guided path, does the sublimation of these principles reproduce the essence of existence itself? What would this path be? Where does this path take us? Is the course of our existence an attempt to equate life and ethics?

These are some of the questions discussed from examining the concept of bioethics and that are directly related to the idea of environmental bioethics. They turn our attention to the attitudes and impacts of human actions concerning life, the environment, and consequently the need to rethink the human being as a subject responsible for nature. Hence, this exploratory analysis focuses on the discussions within this emerging concept, based on a systemic perspective founded on the philosophical principles of ethics.

The concept of harmony is discussed by reflecting on the *gestalt*, whereas the concept of balance is explained by Aristotle's [5] notion of virtuous life, in which the action is well performed when it is in accordance with the excellence that is proper to it. Dussel's [4] concept of otherness, that is, the consciousness of the other, also stands out, foreseeing V. R. Potter's [7] bioethics, who, through the metaphor of a "bridge to the future," reflects on the need to think about the present and the future. With it, as Pessini [8] points out, comes Jahr's concept of bioethical imperative, solidified in Kant's

philosophy, which is emblematic of the duty to be consonant with freedom. When fulfilling an ethical duty, one allows oneself and the other to be free. Such considerations open the doors to the concept of responsibility of environmental bioethics, thus outlining the space for reflections in the Amazon region.

Recipient of the largest biodiversity in the world, the Amazon region and its preservation constitutes the core and focus of bioethics. Harmony and balance are intrinsic to its own name—"Amazon"—, derived from the Amazon warriors of Greek mythology. This allusion can symbolically represent the aspiration to resolve the historical conflicts in the territory through an adaptive management critical of the exploitation of its natural resources, seeking to balance production and consumption. Such undertaking requires the formation of subjects that care about nature. Thus, the concept of ecological subject emerges, presenting the impacts of human actions on climate and environment, particularly that of deforestation and wildfires on public health.

Bioethics helps us develop the consciousness of a bioethical subject, that is, the awareness of the unavoidable preservation of the Amazon region, and that, without practical ethics, our very existence is at risk. This is where bioethics comes in as a way of being. Bioethics is the awareness that caring and loving life—biophilia—are part of nature itself, constituting its ontological, gnoseological, and axiological foundation. Being, knowledge, and the vital values of existence are built in the relationship between life and ethics, that is, in bioethics.

References

1. Perls FS. Ego, fome e agressão: uma revisão da teoria e do método de Freud. São Paulo: Summus; 2002.
2. Rollinger R, Ierna C. Christian von Ehrenfels. In: Zalta EN, editor. Stanford encyclopedia of philosophy [Internet]. Stanford: Stanford University; 2019 [acesso 16 maio 2022]. Disponível: https://stanford.io/3ModTUH
3. Jacques MGC, Strey MN, Bernardes MG, Guareschi PA, Carlos SA, Fonseca TMG. Psicologia social contemporânea. Petrópolis: Vozes; 2012.
4. Dussel E. Para uma ética da libertação latino-americana. São Paulo: Loyola; 1977.
5. Aristóteles. Ética a Nicômaco. São Paulo: Nova Cultural; 1984. p. 56.
6. Aristóteles. Op. cit. p. 57.
7. Potter VR. Bioética: ponte para o futuro. São Paulo: Loyola; 2016.
8. Pessini L. As origens da bioética: do credo bioético de Potter ao imperativo bioético de Fritz Jahr. Rev. bioét. (Impr.) [Internet]. 2013 [acesso 14 out 2021];21(1):9-19. Disponível: https://bit.ly/3szRBrm
9. Post SG. Encyclopedia of bioethics. 3ª ed. New York: Thomson Gale; 2004.
10. Costa KS. Apontamentos sobre a formação histórica da Amazônia: uma abordagem continental. FLACSO-Brasil [Internet]. 2009 [acesso 14 out 2021];1-25. Disponível: https://bit.ly/3FPpNEv
11. Pereira LHM. Notícias da Amazônia: a cultura jornalística hegemônica das televisões portuguesa e brasileira [tese] [Internet]. Coimbra: Universidade de Coimbra; 2014 [acesso 8 ago 2018]. Disponível: https://bit.ly/3PqNPu8
12. Pinheiro ATP. Viver amazônico. Porto Velho: Grafiel; 2004.
13. Pereira FK. Painel de lendas & mitos da Amazônia [Internet]. Belém: Falângola; 2001 [acesso 8 ago 2018]. Disponível: https://bit.ly/3lf04vU
14. Camilo J. Em busca do país das Amazonas: o mito, o mapa, a fronteira [Internet]. In: Anais do 1º Simpósio Brasileiro de Cartografia Histórica; 10-13 maio 2011; Paraty. Belo Horizonte: UFMG; 2011 [acesso 14 out 2021]. Disponível: https://bit.ly/3sGHX67
15. Kischlat EE. Os conceitos de espécie: uma abordagem prática. Caderno La Salle XI [Internet]. 2005 [acesso 14 out 2021];2(1):11-35. Disponível: https://bit.ly/3MmA9OE
16. Steil CA, Carvalho ICM. Epistemologias ecológicas: delimitando um conceito. Mana [Internet]. 2014 [acesso 14 out 2021];20(1):163-83. p. 163. DOI: 10.1590/S0104-93132014000100006

17. Carvalho ICM. O sujeito ecológico: a formação de novas identidades na escola. In: Pernambuco M, Paiva I, editores. Práticas coletivas na escola [Internet]. Campinas: Mercado de Letras; 2013 [acesso 14 out 2021]. p. 115-24. Disponível: https://bit.ly/3witDDh

18. Fischer ML, Cunha T, Renk V, Sganzerla A, Santos JZ. Da ética ambiental à bioética ambiental: antecedentes, trajetórias e perspectivas. Hist Ciênc Saúde [Internet]. 2017 [acesso 14 out 2021];24(2):391-409. DOI: 10.1590/S0104-59702017000200005

19. Becker BK. Amazônia: mudança climática, projetos globais e interesse nacional. Parc Estrat [Internet]. 2013 [acesso 14 out 2021];18(36):107-28. p. 108. Disponível: https://bit.ly/3LfMJ0T

20. Brasil. Decreto nº 5.455, de 12 de maio de 2005. Promulga o Protocolo de Quioto à Convenção-Quadro das Nações Unidas sobre Mudança do Clima, aberto a assinaturas na cidade de Quioto, Japão, em 11 de dezembro de 1997, por ocasião da Terceira Conferência das Partes da Convenção-Quadro das Nações Unidas sobre Mudança do Clima. Diário Oficial da União [Internet]. Brasília, p. 5, 3 jun 2005 [acesso 17 maio 2022]. Seção 1. Disponível: https://bit.ly/3PvWnA2

21. Ribeiro WC. Mudanças climáticas, realismo e multilateralismo. Terra Livre [Internet]. 2002 [acesso 14 out 2021];1(18):75-84. Disponível: https://bit.ly/3lbRcav

22. Homma AKO. Amazônia: meio ambiente e desenvolvimento agrícola. Brasília: Embrapa; 1998.

23. Amazônia, maior reserva de biodiversidade do planeta. Estadão [Internet]. Ciência, 4 dez 2002 [acesso 14 out 2021]. Disponível: https://bit.ly/3yFzT9J

24. Ramos MC. O desenvolvimento econômico na Amazônia Legal: seus impactos sociais, ambientais e climáticos e as perspectivas para a região. Cadernos do Programa de Pós-Graduação em Direito/UFRGS [Internet]. 2014 [acesso 14 out 2021];9(1):1-15. DOI: 10.22456/2317-8558.45010

25. Brasil. Lei nº 12.187, de 29 de dezembro de 2009. Institui a Política Nacional sobre Mudança do Clima – PNMC e dá outras providências. Diário Oficial da União [Internet]. Brasília, p. 109, 29 dez 2009 [acesso 14 out 2021]. Seção 1. Disponível: https://bit.ly/3sCxgBu

26. Instituto Nacional de Pesquisas Espaciais. PRODES: Coordenação-Geral de Observação da Terra. Inpe [Internet]. [s.d.] [acesso 6 jun 2022]. Disponível: https://bit.ly/3ncXuHK

27. Brasil. Lei nº 12.651, de 25 de março de 2012. Dispõe sobre a proteção da vegetação nativa; altera as Leis nº 6.938, de 31 de agosto de 1981, 9.393, de 19 de dezembro de 1996, e 11.428, de 22 de dezembro de 2006; revoga as Leis n. 4.771, de 15 de setembro de 1965, e 7.754, de 14 de abril de 1989, e a Medida Provisória nº 2.166-67, de 24 de agosto de 2001; e dá outras providências. Diário Oficial da União [Internet]. Brasília, p. 1, 28 maio 2012 [acesso 14 out 2021]. Seção 1. Disponível: https://bit.ly/3Ml7BoK

28. Aristóteles. Op. cit. p. 58.

29. Sgreccia E. Manual de bioética: fundamentos e ética biomédica. São Paulo: Loyola; 1996.

30. Couto RCS. Saúde e projetos de desenvolvimento na Amazônia: o caso das hidrelétricas. Novos Cadernos NAEA [Internet]. 1999 [acesso 14 out 2021];2(2):205-16. DOI: 10.5801/ncn.v2i2.118

31. Ignotti E, Hacon SS, Silva AMC, Junger, WL, Castro H. Efeitos das queimadas na Amazônia: método de seleção dos municípios segundo indicadores de saúde. Rev bras epidemiol [Internet]. 2007 [acesso 14 out 2021];10(4):453-64. DOI: 10. 1590/S1415-790X2007000400003

32. Paiva MAS, Reis FJC, Fisher GB, Rozov T. Pneumonia na infância. J pneumol [Internet]. 1998 [acesso 14 out 2021];24(2):101-8. Disponível: https://bit.ly/3FOXtCk

33. Prietsch SOM. Doença aguda das vias aéreas em menores de cinco anos: influência do ambiente doméstico e do tabagismo materno. J pediatr (Rio J) [Internet]. 2002 [acesso 14 out 2021];78(5):415-22. DOI: 10.1590/S0021-75572002000500013

34. Mascarenhas MDM, Vieira LC, Lanzieri TM, Leal APPR, Duarte AF, Hatch DL. Poluição atmosférica devido à queima de biomassa florestal e atendimentos de emergência por doença respiratória em Rio Branco. J Bras Pneumol [Internet]. 2008 [acesso 14 out 2021];34(1):42-6. DOI: 10.1590/S1806-37132008000100008

35. Pinheiro P. Perigos da inalação de fumaça em incêndio. MD Saúde [Internet]. 2017 [acesso 14 out 2021]. Disponível: https://bit.ly/3yBuWyA

36. Silva KM, Bromerschenckel AIM. Fisioterapia respiratória nas doenças pulmonares obstrutivas crônicas. Rev HUPE [Internet]. 2013 [acesso 9 maio 2022];12(2):94-100. DOI: 10.12957/rhupe.2013.8493

37. Confalonieri UEC. Saúde na Amazônia: um modelo conceitual para a análise de paisagens e doenças. Estud Av [Internet]. 1995 [acesso 14 out 2021];19(53):221-36. DOI: 10.1590/S0103-40142005000100014

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Raquel Páscoa da Veiga Frade Santana raised the bioethical problems of research, brought philosophical reflections, guided all research and elaborated the introduction and final considerations. Erika Caroline Goese reviewed the article for submission and elaborated the topic "Historical and mythological peculiarities of Amazonian life." Juliana Guedes de Souza brought the legal issues and elaborated the topic "Deforestation, burning, its effects and combat policies." Nathalia de Souza Cardoso brought biological issues and elaborated the topic "Climate and resilience." Élen Carolina Silva Barbosa brought physiological problems and elaborated the topic "Occurrences and aggravations of fires in social life."

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