

Article

What Do Indigenous Perspectives from the Americas on Nonhuman Beings Tell Us Considering Artificial Intelligence, Humanoid Robots, and Synthetic Life Forms?

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ABSTRACT: This essay examines the understanding of artificial intelligence, humanoid robots, and biohybrid systems—or synthetic life forms—from an indigenous perspective in the Americas. Building on a critical examination of the ontological turn, this essay explores the significance of relationality for indigenous peoples beyond concepts such as animism or new animism. The ontological turn does not establish substantive connections to the modern world regarding these entities. However, techno-animism seems to suggest an ontological approach to artificial intelligence, though it does not explain how ontology develops in practice for humans and nonhumans alike. Based on reflections on indigenous perspectives in the Americas, this essay attempts to develop an alternative foundation for ontology regarding artificial intelligence, humanoid robots, and biohybrid systems or synthetic life forms—entities that are more than just tools or machines.

Keywords: Ontological turn; Anthropology; Indigenous peoples; Americas; Nonhuman; Artificial intelligence; Biorobots; Techno-animism; Animism

1. Introduction

Rather than a traditional ethnographic study, this contribution is a reflective examination of how the indigenous perspective from the Americas on ontology can shape our understanding of artificial intelligence, humanoid robots, and synthetic life forms that permeate the modern world. It focuses on nonhumans with whom indigenous peoples in the Americas interact. Their “relational worlds” bring to mind a world that appears far less “pre-modern” than the ontological turn suggested, particularly in light of today’s sociotechnological achievements, such as artificial intelligence, humanoid robots, and biohybrid systems—or synthetic life forms. This is particularly true regarding the ontological turn’s aim to overcome the Western separation of nature and culture. Thus, the indigenous perspective appears much more “modern” and “posthuman” in terms of the coexistence of humans and nonhumans. Here, “posthuman” does not refer to transhumanism or posthumanism, which concerns transcending or overcoming humanity. Rather, it is

understood as a project that explores how humans and nonhumans—which are more than just things, objects, or products—might interact [1,2]. However, neither animism nor new animism nor the ontological turn alone can answer how “mountains”, “water”, or “spirits” become self-sustaining agents for indigenous peoples. Philippe Descola’s monistic anthropology and “standard” animism also fall short of providing a sufficient explanation [3–7]. According to Descola [3] (pp. 4–6), agents sharing the same interiorities ensure a human connection despite differing physicalities with regard to corporeality, speaking of specific kinship relationships between humans and nonhumans, such as the relationships that the Jivaro people in Ecuador maintain with certain animals and plants, based on a shared interiority or “soul”. However, the situation is quite different for other indigenous communities in the Americas. The relationships there may be different in nature and not directly kinship-based, even though “mountains”, “earth”, “water”, “souls”, “spirits”, and “corn” may also fall under the category of nonhuman life forces [8–13]. In both cases, however, these relationships enable indigenous peoples to create a functional world of relationships in which nonhumans, beyond the indigenous worldview, are granted their own reality and ontology, or autonomy. In other words, the intended parallel between sociocultural nonhumans, as described from an indigenous perspective in the context of the ontological turn, and sociotechnological achievements, the new nonhumans with which humans must contend in their everyday practices, could be viewed phenomenologically as similar processes. This helps us understand how reality and ontology come into being in each case and, more generally, how they incorporate both human and nonhuman perspectives.

Following the introduction, the second section of this reflection sheds light on the indigenous perspective of the Americas as a twofold transformation within process ontology. While the ontological turn barely goes beyond the uninformative concept of relationality to describe how nonhumans are epistemologically anchored—making use of animism, among other approaches, as a prominent heuristic description—this text offers an alternative interpretation. The hypothesis is that these people interact with nonhumans as autonomous systems that relate to their external world in a processual way. In other words, they are not directly dependent on humans or on anthropocentric perspectives. However, the interpretation of “animism” or “new animism” used in cultural studies to illustrate how people from Western and non-Western cultural perspectives (e.g., Japanese Shintoism) interact with nonhumans, or to understand new technologies, does not explain how nonhumans become autonomous agents from a human viewpoint. Instead, the ontological viewpoint of people is taken for granted, thereby limiting understanding of nonhumans as autonomous agents by assuming that only humans can perceive them in this way [14–19]. It is hypothesized that nonhumans, such as artificial intelligence, humanoid robots, and synthetic life forms, could be better understood or integrated into modern socio-practical life if, in line with indigenous conceptions, they are viewed as relational processes that ground their existence. It will be argued that indigenous ontology is a particular perspective in its outcome regarding the relation of things, but not in the general approach to the process. Indigenous peoples of the Americas interact with various nonhuman life forces that constitute their particular reality. However, from a processual viewpoint, these relations can be considered to constitute a universal way in which humans structure their reality, thereby creating specific, culturally determined ontological assumptions about the world. In this sense, this essay can also be understood as a broader approach to human universals and the human condition, taking either a cultural anthropological [20,21] or a philosophical neuroscientific perspective [22]. The concepts of animism and new animism do little to explain how indigenous peoples establish relationships with, or regard, nonhumans as co-constitutive agents in the world [3–7]. A more comprehensive approach involves identifying processes that shape ontologies and create different realities in people’s daily interactions [23]. A more universalistic approach—or even a new universalism—must consider what new technologies, such as artificial intelligence, humanoid robots, and biohybrid social forms, mean not only for the academic understanding or people in general but also for how humans and nonhumans alike establish mutual, dependent, relational ontologies. Since previous experiences and interactions with nonhumans lead to

ontological differences among humans, one must ask whether something analogous might occur from the perspective of technological nonhumans as well [24]. Techno-animism, or animism as proposed, makes this only partially understandable [15–19].

Since the 1990s, the ontological turn has transformed our understanding of how humans conceive of their world, or more specifically, how they conceive of things in terms of their existence. Criticism of the Western separation of nature and culture shows that the world does not exist solely from a Western ontological perspective. Rather, the world reveals itself as a pluriverse, in which the ultimate being of things depends on how people in their respective communities constitute their own reality [25]. The works of Michel Callon and Bruno Latour in Science and Technology Studies (STS) mark the beginning of this ontological shift [26,27]. Subsequently, the focus shifted to art objects as the immediate “Other” through the concept of “social agency” [28], which was elaborated differently by Descola [3], Eduardo Viveiros de Castro [29], Eduardo Kohn [30], and others from the perspective of the ontological turn. Since then, cultural anthropology, sociology, philosophy, and political science have argued that “things” differ depending on the nature of the manifest reality experienced by indigenous peoples and their communities. The focus has particularly shifted, although not exclusively so, to indigenous perspectives in the Americas and how “things” are viewed there from epistemological and ontological standpoints. However, sociotechnological achievements, including electric vehicles, computers, and machines, which also encompass the modern indigenous world, are not considered in these studies when addressing the concept of nonhumans. This is true for both the studies of science and technology and the narrowly defined ontological turn articulated by Descola [3], Viveiros de Castro [29], and Kohn [30]. Studies of science and technology, as well as cultural studies—particularly ethnology—reject the Western understanding of the separation between nature and culture. These studies also seek alternative perspectives on the world and nature regarding nonhumans, including indigenous viewpoints. However, the studies of science and technology differ from cultural studies in their approach. The former largely deals with “things” or “actors” embedded in “interactions”, as in Callon and Latour’s actor-network theory [26,27], or in “intra-actions”, as in Barad’s agential realism [31,32]. In contrast, the latter have moved beyond these conceptualizations, focusing on different socially dynamic beings that equate nonhumans and humans ontologically and practically. This has led scholars to assume that nonhumans for indigenous peoples are more human- or person-like than object-like. For indigenous peoples, however, “being a person” does not automatically mean “being human”, even though Descola’s “standard” animism suggests otherwise [3] (pp. 141–143). In a broader sense, this means that the ontological and epistemological foundations of indigenous perspectives must be reconsidered in science, reorienting universal assumptions [33] (pp. 2–6).

From a sociotechnical perspective, the boundaries between the “things” created by science have long since become blurred. This is evident in electric vehicles, computers, machines, general artificial intelligence, humanoid robots, and biorobots [34–38]. In this respect, the distinction between an ATM, an autopilot, general artificial intelligence, humanoid robots, and other things, such as drones, is not merely semantic. Rather, it is a distinction between a “systemic artificial agent” and an “individual artificial agent” [38] (pp. 88–89). While the former is part of a larger system, the latter is proving to be increasingly self-sufficient. However, such an agent is neither invisible nor anonymous, and its actions are not always attributable to itself. The concept of the “actor” proposed by Callon and Latour in STS already reaches its limits at this point. Generative artificial intelligence and large language models are not neutral or mere tools. Rather, they alter how people think about and interact with the world [35] (pp. 246–249). This is particularly true of agential artificial intelligence, which acts in real time [39] (pp. 15–19). Humanoid robots, however, are less “humanoid” and more “humanoidic”. They merely resemble humans and interact with them in a “cyber-physical world” that forms a “robosphere” [34] (pp. 1201, 1206). Artificial intelligence is not only much more organizational and problem-solving in its responses, but it can also appear “emotional” to humans [40] (pp. 10, 27–30). This leads to an overlap between robots and organisms, resulting in so-called

biohybrid robots, “biohybrid systems”, or “xenobots”. Due to their ability to maintain their own structure and function, robots move away from the notion that they are merely machines. Here, the general boundary is between the animate and inanimate worlds [41] (p. 677, table 1). Fifteen years ago, the problematic distinction between machines and organisms was significantly altered by products of synthetic biology, such as biological robots [42] (p. 60, figures 1 and 62). Consequently, the early 20th-century notion that organisms are machines has been overturned, not through ontological practice, but through academic rethinking of ontological possibilities. Now, through the translation of biology into technology, the original is imitated or simulated rather than copied directly. This raises the question of whether machines are living beings and how “machine” can be defined if it is no longer a “machine” in the traditional sense [36] (p. 132). Some argue that biohybrid robots exhibit intelligence through physical laws, movement, behavioral changes in response to their environment, interaction with others, and environmental dynamics [36] (pp. 114–116).

How, then, can such considerations regarding modern technology and the existence of things with which humans interact, communicate, and maintain emotional relationships be understood in light of ontological views that may seem foreign at first, such as those embodied in indigenous perspectives on sociocultural nonhumans? [43] (p. 333); [15] (p. 4). The question arises as to what can be gained from an indigenous perspective on nonhumans—beyond the concepts of animism and new animism—for understanding the relationship between humans and nonhumans.

Asking this question does not mean we idealize the worldview of indigenous peoples as a solution to new phenomena or adopt their ontological conceptualizations. Nor does it mean we argue against technological developments that cannot be reversed today. Indigenous peoples cannot simply be regarded as “pre-modern”, “traditional”, or “natural” as a philanthropic argument for a “better world”. Their view of nonhumans in social relationships with humans must be understood as a processual approach that goes beyond simple relationality. This approach encompasses unconditional acceptance of relationality as interaction, not just reciprocity. This relationality encompasses the complex structure of interactive relationships between humans and nonhumans revealed by “multiple modernities” [44] and “transmodernity” [45]: relationships involving material, immaterial, and technologically produced entities. In this respect, indigenous approaches are highly likely to differ significantly, both epistemologically and ontologically, from those still espoused by Descola [3] and Viveiros de Castro [29], for example, regarding sociocultural nonhumans, which exclude any form of technology. Conversely, it is reasonable to suspect that artificial intelligence, humanoid robots, and biorobots will become part of the next generation of human social relationships. In this sense, the “posthuman” [1,2] becomes a political project concerning the relationship between humans and technology as nonhumans. Rather than transcending humans or humanity, as technological posthumanism suggests, this posthumanism aims to understand the new conditions under which humans and nonhumans interact, live, and shape their reality and ontology—not only through academic theorization but also through everyday practices. This means we recognize that in a constantly changing world, ontologically significant relationships are developing, providing insight into how humans and nonhumans create their local reality depending on circumstances [13,46]. It will be interesting to observe how indigenous peoples themselves respond to and adapt to these new circumstances in the future—a topic that has been overlooked thus far.

2. From “Nature” to Multiple Ontological Worlds

Examining the indigenous perspective from the standpoint of the ontological turn, particularly with regard to the Americas, has led not only to the assumption that their ontology differs significantly from that of the Western world and from a worldview based on a division between culture and nature. It has also led to the assumption that these perspectives, or the ontological views they represent, are incommensurable and unique to the communities in which they exist—a viewpoint that is itself open to criticism [47] (p. 50), [48]

(p. 270). This incommensurability is grounded in the unique relationships humans form with nonhuman beings, such as plants, animals, and significant objects. Descola illustrates this idea in his book *Beyond Nature and Culture* using the example of the Jivaro in Ecuador [3] (pp. 4–6).

However, his portrayal of indigenous Amazonian ontology as a “pre-modern” conceptualization of world order is questionable because it idealizes indigenous cultures, like what Latour has done [49] (p. 12). Examining “the place of nonhumans in indigenous ontologies” as if they lived “in harmony with nature” [50] (p. 1), reinforces the image of the “noble savage” and the idea that people’s interactions with “things” are refreshingly different from those of the observers, such as ethnologists or cultural anthropologists. In a romantic sense—perhaps unintentionally—the ontological turn emphasizes the incompatibility of our world, and by extension, of other worlds, with theirs. However, this makes it more difficult to understand how modern trends might structure the world through new relationships between humans and things, or how they already do so. In general, Descola and the ontological turn generally regard the indigenous perspective as one in which humans and nonhumans are equal partners in reciprocal relationships [51] (p. 1). Yet, little to no description exists of how this relationship comes about. Furthermore, the human perspective remains dominant within Descola’s monistic anthropological framework, as well as within the positions of others, such as Viveiros de Castro’s so-called perspectivism and multinaturalism [29,52,53]. This also holds true in approaches where technologies such as artificial intelligence or humanoid robots play a larger role in addressing the connection between humans and nonhumans. The focus shifts from the existence of distinct entities in reality and their interactions to the moral status to be accorded to them within the human universe [15] (pp. 4, 11, 20–22, 84–85). However, the ethical dimension introduced from the human perspective is nevertheless different from the ontological perspective referred to here. This perspective is one that both humans and nonhumans can contribute to equally, and it determines how they interact. The ontological turn and approaches related to morality and ethics, such as Webb Keane’s [15,54], argue exclusively from an anthropological perspective. Thus, they remain entrenched in a world of anthropological perception that determines the relationships with other things in a one-dimensional way. However, this is precisely what indigenous perspectives, which recognize a processual grounding, and current developments regarding artificial intelligence, humanoid robots, and biohybrid beings already contradict. Therefore, it can be assumed that no relationship has primacy over another “thing”; rather, mutual interdependence must be assumed in an understanding of ontology that goes beyond material possibilities. While, as has been outlined, animism and new animism rely on humans as a framework for ontological understanding and new materialism attempts to identify immateriality as interdependence between a relationship and a “thing’s” materiality [55–64], the indigenous understanding in the Americas seems to be different. Ontology appears as a process and as the “in-between and among relationships and things” [23]. More generally, from an indigenous perspective, things are neither ontological in the way that a one-dimensional relationship would suggest nor in the way that the constitution of the thing itself would suggest. The German term “Beziehung von Dingen” therefore refers to the process of mutual dependence between relationships and things. In this process, neither is primary, yet both are ontologically determinative. This term cannot be satisfactorily rendered in English as “relation of things”, “relationship between things”, “relation-of-things”, or any other way. Thus, the term “between and in-between relationships and things” is used here as an alternative. Based on this understanding, ontology is a fusion of relationships involving “things”; that is, a process in which both relationships and things are related to one another, like words in a sentence, with no clear separation. Since the way humans conceptualize their environment consists of patterns that are not entirely predetermined phylogenetically or endogenetically and cannot be relied on to justify or understand nonhumans, one must assume a continuous process. This process is shaped within given frameworks for the purpose of identity formation in everyday practices. This process constitutes what is referred to here as the “in-between and in-between of relationships and things” and refers to ontological assumptions about understanding reality. This process implies that ontology and

identity are formed through everyday practices within given frameworks and are subject to change [46] (pp. 33, 47) [30,65]. This theoretical perspective, derived from an indigenous viewpoint, contradicts the prevailing understanding of ontology in cultural studies. Ontology is often described as a stable, repetitive relationship grounded in traditions, cultural heritage, or the corresponding cosmovision [3–8,29,51–53]. However, if morality is about how one deals with things in practice, even in the short term, and ethics is about one's attitude toward life based on the relationship that arises through ontology via the network itself [54] (pp. 18–20), then ontology is the foundation for both. Thus, the differences in morality among societies are primarily differences in ontology, specifically in how the relationships among things are understood. However, there is still no consensus on ethics, morality, or how ontology operates within both, nor on how humans arrived at their individual and collective understandings in practice. Therefore, ontology is neither stable nor directly related to morality or ethics, but rather, it is related to both. This relationship arises without primacy yet shapes reality in its entirety. In this respect, the concept of animism is of limited value in terms of incorporating the aforementioned ontological findings regarding humans and nonhumans. However, it has returned, as already outlined, to the forefront of the ontological turn when it comes to understanding technology, such as artificial intelligence, as an approach to the animate [15] (pp. 105–111), [16–19]. However, the latter term dates back to the nineteenth century, when Edward Tylor applied it to the notion that things possess a soul. It has long since become obsolete. Even the modified “new animism” in cultural studies, which has been in use since the 1960s and formed the basis for the ontological turn, is open to criticism as it merely equates nonhumans with personhood [50] (p. 14), [3–7]. A similar argument can be found in “techno-animism”, which posits that general artificial intelligence, including algorithms or humanoid robots, is characterized by a kind of life force or personhood [14–19]. Techno-animism favors the understanding of nonhumans exclusively from an anthropocentric perspective. Epistemologically, however, this introduces an ontological interjection that undermines the question of how humans and nonhumans interact based on their respective ontological perspectives. Yet, the indigenous perspective in the Americas demonstrates that ontology is not a one-dimensional process of emergence. David Kopenawa, a ritual specialist and shaman from the Yanomami—one of the most extensively studied indigenous peoples in the Amazon region who disparagingly are referred to as “the wild people” [66,67] (pp. 4–6)—makes it clear that the *xapiri* and their close sociocultural relationships are merely “images of our ancestral beings”, the animals called “*yarori*” from which they once emerged. These *xapiri* are neither “like animals nor like humans”. They do not drink water from the river nor eat meat; rather, they feed exclusively on sweet foods. Depending on the category of *xapiri*, which is associated with different animals, their diet varies. Overall, however, it differs significantly from that of humans. Their “personhood” differs from that of humans in the way they live. Even from an organic perspective, their excrement smells pleasant, whereas human excrement stinks due to meat consumption [68] (pp. 140–141, 161). Evidence of different “personhood” in relationships with nonhumans is not unique to the Yanomami; it is attested throughout the Americas. The pre-Hispanic Maya, for example, believed that their gods and other nonhumans fed on floral scents and smoke rather than animal or human flesh [69] (pp. 122–124). The Mixtecs of central Mexico believe that their gods consume pulque, fragrant scents, incense, and flowers. Their ancestors (*nu ñu'un*) are said to have eaten three times a day like humans, but they ate humans or the deceased instead of tortillas and beans [10] (pp. 225–226). The Aztecs of central Mexico believed that gold was the excrement of their gods, who consumed humans as food [70] (Codex Florentinus, section “Earthly Things”). Even the earth, as a nonhuman being and organic entity, must be nourished. Among many indigenous peoples, including those in Central Mexico, it is believed that the earth drinks blood [71] (p. 169) or, as in the case of the Aztecs, consumes sacrificed children [72] (pp. 219, 226). However, there are many local variations. For example, the Tzeltal people of the Chiapas highlands in the 20th century believed that their gods ate everything humans eat [73] (p. 1). One could argue that the type of food or diet is related not only to the ontological

assumption of who acts, but also to the ontology of the acting being itself and the associated ontological processes. A doubly ontologically encoded reciprocity emerges.

Moving from the Amazon region to Mesoamerica—the region that today encompasses Mexico and El Salvador—two additional forms of interaction between humans and nonhumans emerge. These interactions are crucial to the overall well-being of people in Mesoamerica. However, they differ from the kinship relations described by Descola in the Amazon region. In Mesoamerica, a relationship exists between an individual and a “co-essence”. Coined in the 1960s, this term refers to individuals who are related to another entity. Nonhumans as “co-essence” could be phenomenologically distinct entities, including animals, natural phenomena, and other things. This “co-essence” is bestowed upon individuals from birth, most likely by fate. It is then regarded as a connection within a mutual, reciprocal relationship that can only be consciously experienced in a dream. This applies not only to humans, but also to mountains, rain, and the moon, all of which possess a “co-essence”. This reflects what people in the Amazon region have recognized: “Personhood” is not innate but is closely tied to time and place. In Mesoamerica, one person’s fate can influence another’s living conditions [74] (pp. 141–143). From an ontological perspective, therefore, there is neither a “single person”, a “single co-essence”, an “alter ego”, nor a “soul”, as these phenomena are sometimes called. Rather, there is an interdependent relationship among “things” that do not oppose one another with no primacy between things and relationships. No single being can live according to its own conditions because they are all closely intertwined. Furthermore, the “self” is complex among the Tzotzil Maya of the Chiapas highlands and other Mesoamerican peoples. They recognize an “awake self”, an “essential soul”, and a “natal animal companion”, generally referred to as a “co-essence” [75] (p. 707). Unlike other conceptions, including Western ones, the Tzotzil experiences a transition in dreams from an “unconscious self-experience” to a “more consciously articulated self-experience” [17] (p. 713). Contrary to what one might expect, the Tzotzil experiences an “intersubjective interaction” between the various “self”- or “soul”-like beings only during sleep, not while awake [76] (p. 285). Therefore, dreaming is not an individual experience here, as Maurice Halbwachs [77] (p. 172) suggested when theorizing about “social memory” and explaining how it enables individuals to completely detach from society while remembering. Among the Maya—or in Mesoamerica more generally—dreaming is the ability to see others internally, as well as access the collective conception of them. Furthermore, dreaming provides access to the consciousness or memory of this form of “self” discussed here.

“Earth Lords”, sometimes referred to as “mountain spirits”, have been extensively studied in Mesoamerica. However, similar concepts can also be found among the indigenous peoples of the Andes. The Mam and other Maya in the highlands of Guatemala and Chiapas, Mexico, regard these “mountains” as their ancestors, even though they are not mountains in the conventional sense. Unlike Catholic saints, the Earth Lords are part of a village’s landscape. Saints, on the other hand, are venerated and housed within communities—for example, in a chapel. The Mam call these mountains *taajwa witz*, “owners”, “guardians”, or “lords”. They are interdependent, nonhuman beings. The Mam consider the Hispanicized men, known as “Ladinos” (the Mexican word for hispanized people), to be the owners of what they need. This is also reflected in their clothing and money. Each Ladino, as an “owner”, “guardian”, or “lord”, lives in a cave inside a mountain and owns what the Maya need. They control livestock, rain, health, land, and all its produce [13] (p. 141). This power enables them to enslave Maya souls. Therefore, the Maya’s strategy is to offer sacrifices to the Earth Lord and compensate him for all matters under his control. Traditionally, the lives and affairs of the Maya have been viewed as consisting of relationships with the sacred, the ancestors, and the Earth Lords [13] (p. 144). Among the indigenous peoples of the Andes, such Earth Lords are known as “earth beings” or *tirakuna* when referring to earthly landscape elements in general, such as rocks, rivers, caves, forests, or burial sites. They are also referred to as mountain gods, spirits, or *apus*, which are deities [8] (pp. xiii, 181–182). Although these beings are physically associated with local mountains, they are not direct deities or supernatural beings. Rather, they are “ethnic leaders”, whom ethnologists sometimes refer

to as “mountain gods”. They are powerful figures; sometimes ethnic leaders from pre-Hispanic times [12] (p. 369). Together with agricultural lands, houses, and the deceased, they are given special status as nonhuman beings within a broader framework. In this framework, ontology is expressed through an intertwining of relationships and things that constitute human reality. The ontological turn regards all of these nonhumans as part of a complex web of relationships and things. However, this means that one would have to view ontology as a constantly changing process. For example, after 1940, the mountains of the Mam Earth Lords in Chimaltenango lost their explanatory power for the local population when evangelical and missionary groups challenged Maya’s ontologies [13,65].

3. Between and Betwixt Relations and Things—Artificial Intelligence, Humanoid Robots and Biohybrid Systems

As previously mentioned, cultural studies such as ethnography, ethnohistory, and archaeology provide insight into how indigenous peoples in the Americas—not only in Mesoamerica and South America—cultivate their relationships with “nonhuman” beings. This suggests that indigenous peoples bestow “personhood” upon “nonhumans” or “beings”, not because these beings are ontologically human. Rather, situational contexts in everyday practices, whether ritual or social, enable these beings to be part of human reality. Mountains, the earth, and other relations between humans and nonhumans interact due to their ability to enter into direct, reciprocal, and interdependent relationships as autonomous agents. Thus, like us, indigenous peoples do not view the world as entirely foreign or strange. However, depending on the circumstances, some things are more autonomous. Through this process, only cosmology, tradition, and cultural heritage emerge. How can the indigenous perspective of the Americas, therefore, be transferred to a more general understanding of how humans might recognize and interact with artificial intelligence, humanoid robots, and biohybrid life forms as nonhumans? How could the prevailing academic idea that artificial intelligence, humanoid robots, and biohybrid systems are not simply tools or machines, yet neither autonomous agents fully to be recognized, be reconsidered in light of how indigenous peoples of the Americas recognize them as nonhuman autonomous agents? This may offer another glimpse into overcoming the conceptual boundary between what is considered real and virtual. However, this division may never have been fully fleshed out in human approaches and practices among indigenous peoples or others, as “uncertainty” prevails everywhere regarding what things are in dreams and virtual worlds [78].

Consider how technicians view machines, such as photocopiers, as entities with a life of their own based on their components and how they function [79] (p. 89). The way technicians speak about machines or components reveals the autonomy they attribute to these artifacts. The relationship between the operator or owner of such a machine and the machine itself appears to stem from the machine’s independent existence [79] (p. 94). As previously mentioned, new materialism already offers insights into these phenomena, such as how an object can possess more properties than are visible now of observation [55–64]. However, new materialism differs from the indigenous perspectives in that it focuses on the characteristics, properties, or qualia of objects in relation to other objects or people rather than on relational practices. The art historian Alfred Gell [28] (pp. 20–21) criticized even Latour, noting that a rifle transforms a person into a soldier as soon as they use it. This relationship brings “things” out of isolation and demonstrates that humans are “human” when they interact with these objects [64] (p. 136). Nevertheless, the indigenous peoples’ practices of speaking with and responding to their earth lords, earth beings, co-essences, or spirits situate them within the realm of a whole-body, socio-emotional reality rather than exclusively within the realm of language or thought. These practices are real for the people involved. When people speak to their cars, smartphones, computers, or other objects, or give them names, it may stem from enthusiasm, frustration, or ambivalence toward these “things”. An ontological crisis is possible, if not probable. Meanwhile, virtual assistants such as Alexa (Amazon) and Siri (Apple) are becoming increasingly popular, and voice-to-voice interaction between humans and devices—including generative or agentive

artificial intelligence—is becoming the norm. Large language models embedded in everyday human practices transform the “thing” itself into something distinct from a machine, as their name suggests. This new engagement with artificial intelligence, humanoid robots, and synthetic life forms created through biological means may alter how humans understand these objects in two fundamental ways. Thus, the “thing”, as a “nonhuman being”, is not just merely a mental phenomenon, or an “ontological metaphor” [80]. Rather, reality appears to be constituted by mutual interaction and daily practice, combining new ontological and virtual realism. This new understanding transcends the separation between different realms of reality, such as analog and virtual [81,82]. While Markus Gabriel’s [83–86] new ontological realism asks what reality is beyond the fact that it is constructed and plural under the assumption of fields of sense—which are neither considered nor addressed here nor taken as a solution to ontology—David Chalmers’ [81] (pp. 105–107, 242–244) virtual realism refers to immersion in “virtual worlds”. For instance, looking in a rearview mirror while driving a car allows one to take action based on this observation. These realities raise the question of how to interact with and understand artificial intelligence, humanoid robots, and biohybrids. From this perspective, a transformation of relationships through ontological shifts seems possible. From the perspective of indigenous peoples in the Americas, it is possible and not unlikely that these new technologies might be or become autonomous agents, or “nonhumans”. However, the author is not aware of any direct ethnographic fieldwork that addresses this issue. For example, Milton Maldonado and Daniela Córdova-Pintado do not directly address artificial intelligence among Andean indigenous peoples [87]. Instead, they juxtapose their ethics with “Kantian moral rationalism or technical utilitarianism”, a concept more broadly covered by Hartmut Rosa’s [88] idea of “resonance” or “relationships to the world”. They view artificial intelligence as a threat—an “algorithmic authority” from which a “radical anti-humanism” emerges—and propose considering “alternative forms of knowledge” [87] (pp. 1–2). Nevertheless, there is a tendency for the convergence of relationships and things to replace or overcome the “ontological metaphor” of machines or tools by converting new technologies into nonhuman agents. Further exploration of the grammar through which intelligence, humanoid robots, and biohybrids may become relational nonhuman agents is necessary. This process depends on the faculties of both agents and human interaction. This seems to be how indigenous peoples of the Americas seem to conceptualize the processual relationship between human and nonhuman agents.

In a recently published article titled Artificial Intelligence—Alterity, Chameleon, and Onto-Vision as a New Practice and the Perspective of Social and Cultural Anthropology [24], the author examines how generative and agentic artificial intelligence can be perceived as “alterity” from a cultural anthropological standpoint, rather than humanoid robots or biosynthetic life forms. The article questions the concept of general artificial intelligence as a “third-order technology” that evades complete human control yet has consequences for humans [89] (pp. 35–36). First- and second-order technologies, by contrast, are under direct (e.g., fire as a cultural technique) or partial (e.g., machines) human control. In this sense, artificial intelligence is “in-between”, as it can be unpredictable and have unforeseeable consequences [37]. The article’s formalist perspective is based on three functional foundations anchored in process ontology: logic (not human, but rather communicative and emotional), structure (the “ontology of the digital” as technical operationalization and the “culture of digitality” as cultural operationalization), and practice (the production of culture, new cultural affairs, ontological perspectives, and differences in truth). Thus, artificial intelligence is a form of otherness that transcends functionality. In this sense, artificial intelligence points toward autonomy and is more a self-organizing, self-stabilizing, rule-based system operating based on data flow. The aforementioned article proposes the equation $f(M) = M \times A$, treating artificial intelligence as a machine and an autonomous agent. Here, M stands for machines, and A stands for autonomy. However, indigenous perspectives on relationality demonstrate that “things” can evolve into entities that are neither human nor machine yet possess “personhood”. Thus, the argument for “autonomy” from the previous formula can be redefined as $R(A_{n...1})$. The reformulated formula for understanding artificial intelligence as

otherness, based on indigenous concepts of relationality and the three principles, is $f(M) = M \times R(A_{n...1})$. Here, a machine's function as an autonomous agent is modified by the factor "relationality" (R). However, relationality produces different types of autonomy depending on the machine's local usage conditions (hence $n...1$). Describing the emergent property of relationships as a factor responsible for autonomy in greater detail than before has several advantages. First, it clarifies that a machine-like entity, such as a large language model, is neither a "machine" nor a "model" in third-order technology. This is because its output exceeds its input through stochastic, unpredictable, yet controllable adaptive rules. It exists "between and betwixt relations and things" and points to "alterity". Second, the autonomy required to treat artificial intelligence, humanoid robots, and biorobots as equivalent to Earth lords, Earth beings, mountain spirits, and other highly intervening, entity-like beings that influence human well-being, is not self-evident. Rather, this autonomy is reinforced by the assertion that relationality is the foundation for such a perspective. Third, the overwhelming data flow or action—which is not always attributable to the agent itself (e.g., generative or agentic artificial intelligence in humanoid robots or metabolism in biohybrid robots)—*i.e.*, reactive "alterity", produces nothing that is completely trustworthy or free of contradictions, as relationality operates within its structural apparatus. This means that technical operationalization does not always correspond to cultural operationalization, as described under the heading "structure". Therefore, the autonomy of an adaptive system is still limited in its adaptive emergence. Currently, no artificial intelligence is functionally autonomous enough in its relationality to achieve a "singularity" that could merge the biological and social realms for its own purposes [90–92]. This functionality is not beyond the capabilities of humans and their ontological perceptions. This is why human intervention is not only possible but also necessary for technical reasons, such as power supply, software updates, hardware changes, network connectivity, and security measures. Assuming "limited adaptive emergence" in general artificial intelligence (including generative, agentic, and humanoid types), means accepting that human (e.g., technical maintenance, ethical issues) and nonhuman (e.g., between different types of artificial intelligence) interaction or intervention restricts autonomy and relationality. The generation of artificial intelligence is tied to the conditions under which it occurs, which is why relationality still does not generate autonomous, diverse worlds with different ontological assumptions, or even distorted perspectives, questionable truths, or ethically problematic information. However, the relationality of data—the "between and betwixt relations and things"—already establishes its capability for autonomous operationality.

In social robotics, relationality is now considered a learned behavior resulting from interaction with others, which some label an "emergent phenomenon" [93]. Therefore, cultural behaviors are things that robots can learn by interacting with others in a given environment, whether those others are human or not. This does not require knowledge based on norms, rules, or traditions, nor a "collection of facts". The focus here is on sensorimotor capabilities, or affordances in the sense of James Gibson [94], and how these skills form the basis of learning. Here, the world is a set of possibilities to act upon rather than something given from which to retrieve modes of operation. Thus, the robot exists as part of a whole—that is, the culture that emerges in this way—and not in isolation. This concept is similar to the indigenous views of nonhuman beings. Culture is not initially stored or achieved through existing techniques, objects, modes of communication (oral or otherwise), or forms of transmission, such as social, collective, or cultural memory [77,95–98]. Remembering and forgetting do not make culture an emergent phenomenon whose rules respond to affordances. In this sense, sociotechnological entities are closer not only to the indigenous perspective on nonhuman beings but also to a more vivid and fragile understanding of culture than previously thought. Recently, biology has adopted this line of reasoning as it has moved away from mechanistic assumptions. The metaphysical concept of "everything flows" emphasizes processual ontology, meaning life forms are based on processes that enable co-dependent, hierarchical functionality rather than substances alone [99] (pp. 1–2). This viewpoint enables the identification of biohybrid robots, also referred

to as xenobots, as meromorphic systems. These systems are defined by the relationships between metabolism, physical structure, and symbiotic relationships [36] (p. 165).

4. Discussion and Conclusions

This paper compiles indigenous ontological perceptions from the Americas that recognize nonhuman agents as autonomous and interrelated with human affairs. An anthropocentric worldview has less influence on these perceptions. The processual ontological perceptions of indigenous peoples are, therefore, intriguing for understanding humans in general, as well as artificial intelligence, humanoid robots, and synthetic life forms. The second part of this paper focuses on these topics involving the recognition of a dual perspective on processes that transform ontological perceptions of the world. A world full of “things” and “relations”, with no primacy of one over the other and no foundational ontological principle, exemplifies how a pluriverse of ontologies can be shaped by humans and nonhumans alike. These “things” are “beings” with “personhood” who do not live in isolation and do not constitute entities in the sense of “matter” or “substances”. They exist in seamless, interdependent relationships with one another. Technically speaking, humanity’s increasing engagement with artificial intelligence, humanoid robots, and synthetic life forms illustrates that modernity does not rest solely on manufactured “things” but rather on “things” whose processes are ontologically embedded in ways that enable a self-generating reality of interdependent “alterities”. This transformation occurs from within “things” or “systems” and from the outside in response to internal processes. For indigenous peoples, “mountains”, “Earth Lords”, and “co-essences” are autonomous agents that exist independently of human affairs and indigenous ontological assumptions. Rather, they emerge alongside humans with their own features through relational constitutions. However, they do not constitute a being, substance, or matter alone. Therefore, humans and nonhumans interact differently at social levels. In this sense, a pluralistic view of the world of “things” emerges as a complex, boundless state, albeit with minor or major differences from the ontological viewpoint. Neither animism nor techno-animism captures the processual idea of ontology outlined from the indigenous perspective of the Americas. These positions characterize nonhumans as life forces or artificial intelligence that extend beyond machines, tools, and objects. However, these concepts describe ontological perceptions from a human-centric stance, not from mutual, dependent relations.

Nonhuman autonomous intervention in the world is not a new phenomenon, as demonstrated by the daily lives of indigenous peoples. They understand intervention as the plasticity of the process by which reality is shaped ontologically rather than the reification of an isolated substrate for emergence [43] (pp. 337–339). In this respect, one can describe what it is like to be a bat or explain how “things”, “matter”, or “substance” interact independently of consciousness among entities, or how matter transforms or is created [22,40,41,100]. However, the ontological process requires a dual perspective on the “between and betwixt relations and things”. This means viewing the respective ontology as a perspective on a respective reality that is not an illusion and requires verification in practice. This brings together what is sometimes still considered as being either real or virtual. Thus, both pluriverse processes and ontologies within a shared world are at stake because they are neither given nor fixed and involve the issue of a new universalism [23]. First, how can processual ontology be approached epistemologically and ontologically to understand the different modalities within a relational world? Second, how can the pluriverse be understood as a conceptualization of reality in each instance? Third, how should the modeling of general artificial intelligence, humanoid robots, and synthetic life forms be viewed? These questions raise various ethical issues. The problem is not the process itself, but rather how to engage with the “output” [40,43,87,101,102]. In that sense, although morality and ethics are embedded in ontological assumptions, they likely do not constitute ontological realities on their own. They also do not determine the meaning of ontological relations between interacting entities. In other words, discussions about ethics and new technologies are important, but they do not prevent these systems from interacting based on processual ontological assumptions.

Throughout everyday life experiences, one can examine the state of the ontological process by repeatedly questioning these practices and understanding how they resonate as reality. In the technological age, the dual transformation of the ontological process—from within “things” or “systems” and from the outside in response to internal processes—tests how respective ontological assumptions shift and how new forms of life emerge, including forms of society between humans and autonomous nonhumans. The author proposes reformulating the approach to understanding autonomous nonhumans, such as artificial intelligence, humanoid robots, and synthetic life forms, by introducing relationality to the concept of autonomy. This approach mirrors the processual understanding of ontology held by indigenous peoples and acknowledges that human control or intervention is an anthropocentric bias that cannot be taken for granted in the long term. Cultural studies should embrace these insights and examine their implications. Information and communication, whether verbal or nonverbal, are not self-evident. What matters are weighted relationships, shifting contexts, competing signatures, and feedback loops. This is how the pluriverse—a term coined during the ontological turn to describe an alternative to Western epistemology and ontology—comes into being, albeit in a different form than originally proposed. This requires reevaluating positions and acknowledging that concepts such as animism or techno-animism are not essential to understanding the ontological foundations, shifts, and realities generated by processual relations involving technological endeavors such as artificial intelligence, humanoid robots, and synthetic life forms. These endeavors create new plural realities. This is the posthuman.

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