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Bridging the Gap Between Nature and Culture:

Commons as Multi-Species Alliances in the Natural Material World

1. Introduction: Commons between Anthropocentrism and Ecology

The aim of this article is to produce a critical contribution to contemporary commons scholarship, using the lenses of the environmental humanities. Since the publication of Elinor Ostrom's book *Governing the Commons* in 1990, researches on collective action have multiplied, creating a consolidated community of scholars belonging to different disciplinary fields – from economics to political science, from anthropology to history, etc. Yet, while multidisciplinary approaches to the commons continue to grow, some underlying constraints remain. In this sense, one could argue that commons scholarship has been limited to a one-dimensional angle, especially in regard to the nature of human cooperation and its relation to ecological systems. The main reason can be ascribed to what I have defined as the long shadow of Hardin's 'tragedy of the commons', a socio-biological argument on the inherently selfish nature of human beings.

This has produced a main paradox for researchers approaching commons scholarship – namely, a manifest need to be inherently self-apologetic about the practice of collective action. The issue does not lie in the undeniable idea that different contextual factors can influence the behavior of individuals involved in cooperative practices, but in a prejudicial ethos that considers human nature as inherently individualistic and self-centered. The same Elinor Ostrom, while challenging rationalist assumptions denying the possibility for human groups to pursue joint welfare, described collective action as the result of 'the combinations of situational variables that are most likely to affect individuals' choices of strategies' – individual choice still being a basic assumption of the

argument (Ostrom 1990, 38). In other words, collective action for Ostrom is mainly understood as a relation of forced interdependence, as in several contexts cooperation strategies allow more productivity and personal returns. The implications of this statement are remarkable, as they almost explicitly place human selfishness as the precondition of human sociability – the long shadow of Hardinism still looming in the background. This contrasts with Ostrom’s theory of common-pool resources denying the presence of *any* underlying factor influencing the behavior of people, thus understanding collective action as the result of contextual factors varying according to “the physical world, the rules in use, and the attributes of the individuals involved in a specific setting”. (Ostrom 1990, 47).

This article argues that the current proliferation of non-anthropocentric methodological approaches both in the hard sciences and in the humanities can help enlarging the current conceptual and phenomenological scope of the commons, delineating research grounds that are informed by different philosophical and biological premises. Certainly, a study of the commons challenging the idea of human nature as inherently individualistic cannot be solely constricted within a one-dimensional analysis of individual choices as the precondition for cooperation, but it should take into account exogenous ecological (f)actors as underlying assumptions of collective choices among human societies. While the influence of anthropocentrism in the study of ecological commons has already been discussed by environmental philosophy and psychology (Kortenkamp & Moore 2001), most commons scholarship still lacks a comprehensive approach. In this sense, this text should not be regarded as another contribution analyzing the commons as the product of human epistemology, but as an attempt to look at collective action as part of a dynamic ecological mesh of interrelated entities influencing human practices. In looking for alternative theoretical perspectives informing the universe of the commons, I propose an interpretation of the commons as a bridge concept between nature and culture, participating to a conversation that has been initiated by several humanistic disciplines, such as post-humanism (Haraway 1992; Bennet 2010; Braidotti 2013) the sociology of science (Latour 1993; 2003; 2004; 2005), object-oriented ontology (Harman 2018,

Morton 2010; 2018; 2019), ecocriticism (Iovino & Oppermann 2014), and anthropology (Descola 2013). Although different in methodology and scope, these critical perspectives are today converging toward the emerging interdisciplinary field known as the environmental humanities.

2. Socio-Biological Premises and the Tragedy of the Commons

In her lifelong research on collective action, Elinor Ostrom considered contextual factors as the thermometer of cooperative situations or individualistic choices. Her fascinating interdisciplinary approach, capable of successfully intermingling economic notions of game theory with behavioral psychology and even ethnographic observation, allowed her to construct a convincing argument in favor of cooperative choices as a solution embedded in human groups. As she meaningfully declared in *Governing the Commons*, a study delineating a methodological framework for the study of common-pool resources in different institutional contexts ‘the power of a theory is exactly proportional to the diversity of situations it can explain’ (1990, 24).

Today, commons scholarship is steadily progressing along the path paved by Ostrom’s research in both academic and policy-making contexts, creating a vast literary corpus that demonstrates the success of cooperative choices among different human groups in several historical contexts and geographical scales (e.g. Wall 2017; De Moor 2016 and 2017). However, its main theoretical premises still constitute a contested ground of confrontation: collective action is considered as a complex choice, in constant equilibrium given by the need to negotiate with the natural human drive toward selfishness (Saijo et al. 2017). Contesters of collective action are particularly aided by biologist Garret Hardin’s popular concept of ‘tragedy of the commons’ – a pessimistic argument demonstrating the restraints to cooperative behavior among human groups aiming at maximizing their utilities, as a result of the ‘remorseless working of things’ (1968, 1244).

While Hardin’s pessimistic argument is dwarfed by the valuable amount of evidence in favor of collective action conjured up by researchers over the last decades, commons scholarship still relies on this ethos as one of its main *raison d’être*. Why should a consolidated discipline need to

systematically refute a substantially inconsistent argument in order to legitimize itself? The reason lies well beyond self-referential narcissism or a perverse need to dominate its weaker opponent. The truth is that the theoretical assumptions of commons scholarship continue occupying a niche position in both academic and social discourse, at least compared to the hyper-rational pessimism characterizing Hardin's individualistic paradigm. Rather than for eminently theoretical merits, the success of this simplistic argument lies in its capacity to bridge – or at least smooth – the gap between nature and culture. Although Hardin's argument is mainly based on ungrounded deduction, it successfully drifts through a terrain of alleged heuristic empiricism supported by mathematical and biological assumptions. Moreover, using a psychological argument, Hardin described human consciousness as unnatural and pathological, thus justifying a natural drive towards competition in a 'dog eat dog' biological world (Hardin 1968, 1246-1247). Humankind is therefore physiologically oriented toward the maximization of their personal profit and consequently social arrangements at the core of commons economies are an infringement of personal liberties. In Hardin's own words, 'every new enclosure of the commons involves the infringement of somebody's personal liberty' (1968, 1248).

In this sense, Hardin's argument is inherently *modern*, as it manages to add a weak yet convincing scientific premise to an essentially sociological hypothesis, creating an apparently irrefutable argument relying on allegedly solid scientific ground. As observed by sociobiologist Edward O. Wilson, the advantage of modern science over other investigative approaches equally based on human discernment such as philosophy and religion, lies in the mythopoeic drive of 'scientific materialism' – the idea of science as the most effective problem-solving activity operating through flawless tools and techniques (Wilson 2001, 192-200). In other words, Hardin's tragedy of the commons provided scientific support to a consolidated popular idea regarding human beings as a highly competitive and inherently selfish species. Although its main idea might be inconsistent compared to the large amount of empirical data in favor of collective action collected

over the last decades, the long shadow of Hardinism still provides an argument for individualism that is widely accepted by both academic scholarship and policy makers.

The reason of this success lies in its tight relation with the origin of liberal thought, supported by political and social theorists, whose eminently philosophical arguments also intermingled with proto-biological theories. Perhaps the most meaningful example is constituted by Thomas Malthus' celebrated essay *On the Principle of Population*, a text written as the enclosure movement gained momentum in Great Britain, causing the almost complete disappearance of common lands in favor of private property – what Karl Polanyi would define as the 'great transformation' (Polanyi 2001). Far from venturing into eminently biologist arguments, the essay advocated liberalism by investigating the relationship between economics and population and the mutual constraints that economy and demography exercise on each other. While declaring that demographic growth should be accompanied by a proportional expansion in food production, Malthus advocated ecological determinism, as he considered the forces of nature as an ultimate monitoring system for human action, providing checks and balances aimed at refraining the expansion of human populations (2016, 40-42). While the alleged relation between per capita economic growth and population increase was widely proven wrong by history, it became a great excuse to advocate individualism over collective action (Sowell 1962, 272). Thus, the adoption of an economic system based on private property and the dissolution of every political apparatus of social support were unavoidable measures that needed to be taken in order to incentivize self-reliance and physiological mechanisms to keep populations in check. Malthus considered a liberal system based on private property as the natural state of human beings, whose inherent drive toward expansion would bring to complete chaos a society based on collective property (2016, 53-58). Adopting a successful proto-biological metaphor, Malthus defined humans beings as 'compound beings', whose rationality is continuously impaired by basic physiological needs, just like the physical body is in control over the mind (2016, 65 and 73). In this light, Malthus saw the end of the centuries-old common land regime as a natural

process, although the economic data in his possession proved more efficient in guaranteeing daily subsistence *vis-à-vis* private property (Malthus 2016, 88-89).

Thomas Malthus' extremely liberal socio-economic perspective influenced subsequent political thinkers, in particular the so-called utilitarians, such as Jeremy Bentham and John Stuart Mill. While the abstract-deductive approach of utilitarian thinkers clashed with Malthus' empiricism, his positions on demography and the need to keep population growth in check was consistently endorsed (Sowell 1962, 270). In fact, the utilitarians' position on population checks was even more stringent, advocating birth control through the use of contraceptives, a perspective that Malthus firmly opposed with religious repugnance (Sowell 1962, 268-270). On the other hand, Malthus ecological determinism was not equally endorsed by all utilitarian thinkers. As an example, John Stuart Mill considered the use of systems of social relief as a legitimate measure in order to support poorer social layers (Quinn 2008). Mill's position on both birth control and social relief echoed his ideals of individual freedom of action as an unalienable right of human beings, whose liberty could only be restrained if it threatened the freedom other citizens (Mills 2014, 46-48). However, while Mill's liberal thought displayed both political and social commitment, defending basic rights such as freedom of action within social acceptability and gender equality, his emphasis on individual action betrayed an underlying pessimism on human nature. It is not a coincidence that in his essay *On Liberty*, a renowned political manifesto, Mills defined the human mind as one-sided and as a consequence advocated individual liberty as 'uncontrolled freedom of action', completely disengaged from any social and political contracts, excepts those that involved monetary relations (2014, 33 and 82). In other words, every other form of social contract that implied collective action was refuted as a dangerous infringement of personal freedom and the state had the obligation to guarantee the observation of this basic right (2014, 83).

Perhaps more importantly, Malthus' ecological determinism also influenced a whole generation of evolutionary scientists. The same Charles Darwin, in formulating his natural selection theory, explicitly drew from Malthus' ecological determinism, specifically from the concept of

'survival pressures' as a natural force exercised upon every sentient being part of the ecological food chain (Vorzimmer 1969, 541-542; von Sydow 2012, 175-176). In this light, ecological evolution could be explained as the result of individual ecological pressures, an indissoluble aspect of organic life, complemented by the individualistic tendency to overbreed as the ultimate form of self-assertion (Vorzimmer 1969, 539). Malthusian pessimism also influenced the subsequent generation of Neo-Darwinist scholars, playing a central role in outlining both the socio-political premises of social Darwinism, as well as the scientific ethos of evolutionary biology based on Darwin's theory of natural selection (von Sydow 2012, 20).

Particularly relevant to this research is the example of sociobiology, an attempt to bridge the gap between science and the humanities initiated by Edward O. Wilson. Sociobiology promoted an idea of humans as an 'eusocial' species, a characteristic shared by nineteen animal species, that base their survival on the creation of organized social groups whose resilience is built on social skills and various types of relations between members, consisting of both cooperation and competition (Wilson 2014, 19-22). The acknowledgement of human duplicity, oscillating between cooperative and individualistic behaviors, promoted a complex vision of humankind that is nowadays almost unanimously endorsed by evolutionary biology (Wilson 2014, 27). On the one hand, some of the implications of sociobiology made a strong argument in favor of cooperation as an important driving force for human evolution: multilevel natural selection based on group-to-group competition probably ended up favoring cooperative human groups rather than selfish ones (Wilson 2014, 28-29). However, on the other hand eusociality also endorsed the idea of biological evolution as a process based on kinship evolution, or inclusive fitness. In a nutshell, according to this school of thought evolution is the result of individual choices made by group members in their interactions, passing genes to the next generation as the result of a cost-benefit relation between group members (Hamilton 1964, I-II). In other words, according to inclusive fitness, genetic evolution is the result of individual interaction rather than complex genetic exchange (Wilson 2014, 69).

Naturally, this contributed in promoting a universal vision of humankind as an inherently competitive species, animated by a ‘selfish gene’ deeply grounded in individual action for the sake of physiological evolution, a term popularized by Richard Dawkins (1978). Similarly, the human brain was seen as a functioning device aimed at facilitating the assembling of *human* genes for evolution. In this light, human evolution was considered as a genetically determined process in which cultural learning and behavioral changes had limited possibilities of interference (Wilson 2001, 2 and 41). In a paradoxical turn of events, the deconstructive analysis of sociobiology created a flawed pseudo-scientific narrative of human societies, based on approximate assumptions rather than on scientifically consolidated pieces of evidence – a sociobiology without biology. It is rather evident that Hardin’s neomalthusian argument found great support in sociobiology.

These assumptions are not wrong per se: certainly human beings are the result of hundreds of thousands of years of evolutionary processes that have put an ape species in a rather unique position on the ecological food chain. However, as evolutionary biology has managed to demonstrate over the last years, human evolution cannot be explained through direct interaction with kinship groups but by complex evolutionary processes influenced by a wide set of possible ecological (f)actors that affect gene mutation. In this light, the proliferation of different patterns of social behavior among human societies can be better understood as the result of variations to the genomic ensembles that affect behavior (Wilson 2014, 200-201). The same Wilson would come to dismantle these long-standing assumptions, in a process of *mea culpa* that would lead him to collaborate to a successful study proving the limitations of kin selection by demonstrating the ‘complex dynamical phenomena such as multiple and mixed equilibria, limit cycles, and chaotic attractors, ruling out the possibility of general maximands’ (Allen et al. 2013, 20138). In other words, human evolution cannot be explained as the result of individual choices, but as the ultimate consequence of natural selection by social interaction – that is the ‘inherited propensities to communicate, recognize, evaluate, bond, cooperate, compete and from all these the deep warm pleasure of belonging to your own social group’ (Wilson 2014, 75).

Yet, despite the advancement of these disciplines the dilemma of human actions as the result of cultural or genetic determination continues to sparkle controversies and debates. Redeemed socio-biologists like Wilson have learned to look at human biological constraints with a grain of salt and describe cooperative and individualistic tendencies as the result of an open struggle, in which generosity and social intelligence have to constantly confront a dysfunctional genetic patrimony resulting from thousands of years of hunter-gathering practices (Wilson 2014, 176-179; Winterhalder 2001). At the same time, individualistic paradigms based on Neo-Malthusian philosophical and evolutionary assumptions continue to inform every sphere of human knowledge and social organization, proposing a reified image of human freedom that can hardly accommodate the complexities of a multifaceted ecological system as our biosphere (Burchett 2014). A very telling example is constituted by the way in which the dramatic increase of human involvement in the biosphere's life cycles has led scholars to coin the term 'Anthropocene', certainly a powerful socio-biological concept, but also the reflection of what Richard Dawkins would define as the human selfish gene's capacity to create extended phenotypes (1982).

How can the dominant narrative of human individualism cease to occupy such a prominent role in human epistemological experience? Such a question should particularly interest commons scholarship, as its future success lies exactly in the resolution of this riddle. As it will be shown in the next lines, recent findings in both evolutionary biology and the humanities provide a valuable alternative hermeneutics on the nature of humankind and its role in ecological systems, thus placing human epistemology within a wider ontological context of non-anthropocentrism. Perhaps more importantly, they share the intent to reposition humans on the biosphere, exploring the relation between social constructions and other ecological (f)actors. In this light, commons scholarship has the potential to re-contextualize anthropic processes of collective action, looking at cooperative interactions as part of a wider ecological mesh where different life forms meaningfully intermingle.

3. Ecological Complexity and the Art of Cooperation

If individualism has been at the core of both evolutionary theories and socio-economic paradigms, permeating multiple spheres of human understanding, how can this argument be reverted? A solution to the hegemonic influence of individualism is to analyze patterns of collective action as a unifying principle able to bridge the gap between nature and culture produced by the multiple nuances of scientific reductionism and philosophical essentialism that permeate human knowledge. Such a daring task implies repositioning human actors on the eco-biosphere both scientifically and philosophically, producing a more holistic approach to research able to address the meaningful interconnections between the natural and the social sciences. In other words, it implies unifying scientific and humanistic knowledge, a proposition that today is gaining momentum across both the social sciences (e.g. Haraway 1992; Bennet 2010; Descola 2013; LeCain 2017) and, albeit more reluctantly, the hard sciences (e.g. Wilson 1998 and 2014; Caporael 2001). Ultimately, as observed by Edward Wilson, ‘culture is created by the communal mind, and each mind in turn is product of the genetically structured human brain [...] As part of gene-culture evolution, culture is reconstructed each generation collectively in the minds of individuals [...] But the fundamental biasing influence of the epigenetic rules, being genetic and ineradicable, stays constant’ (Wilson 1998, 127-128).

In this context, multiple are the potential challenges for commons scholarship. First, tackling the study of collective action from this more holistic perspective would allow this research field to gain further legitimacy within the academic world and to fearlessly embrace interdisciplinarity, without risking to be dismissed as a marginal subject wandering between economics-related subjects. Second, it would also allow the commons to face the long shadow of Hardinism with renovated vigor and conviction. Finally, it would connect commons scholarship with other non-anthropocentric critical paradigms, positioning the commons as a bridge concept at the crossroads between nature and culture. Naturally, accomplishing such an ambitious agenda requires to look at both science and the humanities in order to find valuable arguments supporting collective action as both a socio-cultural construction and a biological factor.

A first discipline that could meaningfully intersect with commons scholarship is the expanding field of evolutionary biology. Over the last decades, biologists have come to describe evolution as a science investigating the meaningful connections between different life forms, attempting to overcome neo-Darwinian concepts such as cooperation, competition and selfishness (Harold 2001; Margulis & Sagan 2002, 44). From a purely semantic standpoint, the task mainly consists in creating a better understanding of biology by adopting more suitable terminologies such as metabolic nodes and ecological relations (Margulis & Sagan 2002, 16-17). This ambitious task constitutes an unprecedented possibility for both scientists and social scientists willingly to explore the evolutionary nature of ecological systems, as the result of complex interactions. Remarkably, in its attempt to address complexity beyond scientific reductionism, evolutionary biology has unveiled the complex relational nature of ecological systems, allowing social scientists to adopt some leading concepts in order to describe the art of coexistence.

From a microbiological perspective, evolutionary processes mainly function as a complex mechanisms of metabolic interactions between the molecules that compose the basic infrastructure of life – e.g. proteins, enzymes, acids, etc. These processes happen on a daily basis in every living organism, and are the result of self-organizational mechanisms able to regulate phenotypic variations (Wagner 2014, 57). Self-organization is regulated by a sensitive governance system, able to determine and monitor complex interrelations in which the main features of evolutionary biology appear: predation, adjustment and coexistence (Wagner 2014, 148). Certainly, due to their biological plasticity, bacteria constitute the most interesting example of ecological complexity. Microbial species arguably constitute the fertile ecological meadow that allowed the tree of life to thrive through the optimization of aerobic and photosynthetic metabolisms – so far, about eighty percent of life on earth has been bacterial. Not coincidentally, the evolutionary history of bacterial species reflects the features mentioned above. Margulis and Sagan have addressed the interconnected nature of bacterial evolution adopting the term of ‘restrained predation’. This concept explains evolutionary mutations as the result of a failed predatory relation that turns into

fruitful coexistence, determining game-changing evolutionary patterns (Margulis & Sagan 1986, 130). Perhaps the most successful example of restrained predation is the evolutionary process that has led to the creation of prokaryotic cells – the union between two aerobic ancestral bacteria, as demonstrated by the autonomous genetic patrimony of mitochondria (Margulis & Sagan 1986, 130-131). In this light, the idea of evolutionary processes as the result of long-term symbiotic interactions between different microbial actors in specific environmental conditions becomes a valid hypothesis to justify evolutionary change (Margulis & Sagan 2002, 12-13).

Such a powerful image contains all the main characteristics of biological evolution and helps clarify a key concept in understanding the ecological nature of coexistence: predatory impulses in order to satisfy basic metabolic needs that are however counterbalanced by the natural robustness of life, generating a fruitful coexistence that is in turn responsible for the creation of positive evolutionary feedback loops (Margulis & Sagan 1986, 136; Wagner 2014, 170). Ecological systems are therefore the result of discordant harmonies between different organic entities, whose interaction patterns generate processes of mutual adjustment that in turn trigger evolution (Botkin 2014, 204; Wilson 2014). The implications of this statement are powerful: coexistence, rather than individual striving, stands as the milestone of biological evolution.

What is the role of humankind in this process? Are human beings in their inherent complexity so distant from these ecological laws? For sure, while one should neither praise the exclusive autonomy of human intellect, or advocate its subordination to broader ecological laws, the mysterious parable of human evolution seems to resonate with these evolutionary patterns. As part and parcel of ecological systems, human beings can do little but participate to the mysteries of natural evolution. This does not mean that we should not continue to strive in order to understand ecological processes, but that ultimately every step that we take will always be inscribed in a broader context subjected to specific evolutionary laws. In this light, processes such as restrained predation and symbiosis can easily be applied to humankind, confirming our predatory tendencies as a species, but on our capacity for resilience and ecological adaptation. Naturally, as a late comer

on the biological stage, humankind has led a rather parasitic existence, benefitting of life cycles that had been generated by other entities over long processes of try and error. As observed by Margulis & Sagan, 'human beings are not particularly special, apart, or alone [...] It might be a blow to our collective ego, but we are not masters of life perched on the final rung of an evolutionary ladder. Ours is a permutation of the wisdom of the biosphere [...] We did not invent genetic engineering, we insinuated ourselves into the life cycles of bacteria, which have been directly trading and copying genes on their own for some time now. We did not 'invent' agriculture or locomotion on horseback, we became involved in the life cycles of plants and animals, whose numbers increased in tandem with ours' (1986, 195). Human evolution is therefore the result of our capacity to treasure evolutionary processes accomplished by other species, thus profiting from the organic fabric of life. This tendency has been confirmed by evolutionary psychology, more specifically by the concept of 'prepared learning' – that is, the human likelihood to inherit one or a few alternative behaviors out of many possible (Wilson 2014, 139; Carey 2003, 257-272). Humankind can therefore register and inherit behavioral patterns that are passed along to future generations, thus facilitating their ecological adaptation. The intimate nature of human cooperation starts as a genetic process and its final aim is to pass along essential qualities for survival and coexistence.

Similarly, modern anthropology seems to convene on the idea that food-sharing and its related practices of socialization, rather than warfare, constituted the basis of human societies as we experience them today (Jaeggi & Gurven 2013a; 2013b; 2015). This should not be interpreted simply as a cultural process based on risk maximization through collective action, but as an ultimate instance of prepared learning. While predatory impulses are essential in order to accomplish metabolic cycles – hunting in this case – survival cannot be guaranteed without coexistence and as a consequence human evolution cannot continue without cooperation. Processes of collective action among human society can therefore be considered as the ultimate symbiotic instance of ecological adaptation. Just like the complex web of microbial life, where different (f)actors such as acids, proteins and enzymes establish meaningful interactions able to ensure ecological resiliency through

mutually regulating systems, so the survival of human societies relies on the capacity to coexist, negotiating complexity (Wagner 2014, 148). These assumptions are as powerful as controversial. On the one hand, they deconstruct theories on human cooperation as the result of cultural progress and ideology. However, on the other hand, they conclusively debunk constraining socio-biological arguments on human selfishness, acknowledging ecological complexity and its organized multidimensional fabric as the hidden fabric of life (Wagner 2014, 194). Evolutionary arguments also help to better understand why the current degree of imbalance with other beings cannot last for long and is inherently against the evolutionary patterns described above. The art of coexistence is a mutual process and constitutes the ultimate precondition to evolution and consequently to life. Tools like prepared learning and scientific knowledge can be the torches to guide us in the mysterious darkness of ecological evolution.

In this light, a second essential theoretical premise concerns the philosophical implications of the ecological complexities described above. While the attempt to overcome socio-biological metaphors such as cooperation and competition can be justified by the need to enhance scientific understanding, it poses a further challenge to scholars attempting to bridge the gap between the hard sciences and the humanities. On the other hand, adopting new terminologies provides a great opportunity for social scientists to bypass anthropocentric narratives without necessarily clashing against a consolidated ideological scaffolding. A similar operation has been initiated by the social sciences, that have contributed to debunk the hegemonic narrative placing human epistemology as a determining ecological agent, proposing a non-anthropocentric perspective that embraces ecological complexity. In a sociological sense, we could compare the complex fabric of life that evolutionary biology is progressively unveiling with Bruno Latour's idea of collective society – that is, 'the association of humans and non-humans' (1993, 4). Society is the result of the intermingling between hybrid networks – namely the proliferation of different beings (e.g. people, animals, but also quasi-objects) that constitute a complex social assemblage (2005, 7). This perspective, known as the actor-network theory, constitutes a critique of modernity and its dialectics of purification,

separating humans and society. According to Latour, the social fabric of the world is constituted with different actors that are meaningfully entangled with each other, creating hybrid networks where the borders of nature and culture are blurred, in contrast with the rigidity of modernist categories (1993, 51-55). Reality is a middle kingdom where different actors interact, establishing mutually dependent relations, and nature and culture are its satellites (Latour 1993, 79). Naturally, in such a reality, social strategies based on reciprocity constitute the most pervasive evolutionary strategy for both humans and non-humans (Latour 2005, 69).

In a similar tone, political philosopher Jane Bennet has insisted on the ontological vibrancy of materiality, or to borrow a term from Latour, 'actant objects' (2010, 9). Drawing from Baruch Spinoza's notion of *associative* bodies – that is, socially-oriented entities that continue to mutually affect each other through interaction – Bennet re-conceptualizes reality as the result of the interaction between vital materials, humanity being just one particularly heterogenous assemblage (2010, 11-23). This neo-materialist perspective entails dramatic political consequences, as humans need to develop ethically responsible policies that take into account the confederacy of objects that composes the web of life, as John Dewey would maintain (2010, 36 and 101). If nature is an assemblage of affective bodies in close relation to each other, the art of coexistence constitutes the ontological basis for the future of human societies, who need to devise strategies of harmony with the cluster of bodies that compose the vital materiality of the world.

However, the philosophical perspective addressing the issue of coexistence in ecological system most in-depth is the so-called Object-Oriented Ontology (OOO). Drawing from Heidegger's philosophical thought, OOO places emphasis on the ontological essence of things, looking at their phenomenology, qualities and modes of existence (Harman 2018, 255-260). In this sense, assessing the meaningful material relations and affections that underlie the world of the commons means to develop the capacity to look beyond the superficial cultural layer that engulfs and encompasses them. OOO defines this task as the difference between metaphors and signs, or the capacity to move beyond the sensual relation of objects, learning how to recognize the real and unique characteristics

of objects – also known as *ontography* (Harman 2018, 161). In a more environmentally friendly fashion, Timothy Morton has defined this realization as *ecological awareness* – that is, the capacity to contextualize elements of reality, creating multiple possibilities of interconnection, a *symbiotic real* (2018, 91). The same Morton has connected this philosophical perspective with concepts such as coexistence and solidarity, understood as feelings that allow humans to perceive their degree of interconnectedness with a human-nonhuman symbiotic real, recreating an holistic perspective that agriculturalist visions of the world have contributed to forget (Morton 2019, 13-19). In this light, life resembles a pastiche – an *ecological mesh* composed of complex flows of entities – or strange strangers – that intermingle between each other, creating adaptation through checks and balances that allow our essence to materialize (Morton 2010, 15). The ultimate frontier of ecology is therefore cooperation, translated into trans-species altruism: ‘Community we inherit; we have to choose cooperation. The factory system enabled workers to choose to cooperate with each other by throwing them together, turning them into replaceable parts of replaceable machines. We inhabit a gigantic network of interlocking mechanical structures that become increasingly detailed and increasingly global’ (Morton 2010, 101).

While all different in their radical assumptions, these theories share some basic assumptions. They look at life as a interactive set of agents, each one of them gifted with inherent characteristics that affect other actors in different ways while at the same time keeping each other in check through adaptation strategies, equally based on ontological characteristics and epistemological qualities. Collective action among human societies in this sense emerges as the result of processes of bio-cultural learning, where human epistemology meets the ontological fabric of life and just like for any other agent strives to understand the art of coexistence. This perspective allows to look at collective action as the result of complex evolutionary factors complemented by cultural paradigms. In philosophical terms, one could argue that human epistemology is part of a complex set of ecological relations. The adoption of a similar discourse allows to expand Ostrom’s behavioral paradigm to collective action as the result of contextual human choices. As a consequence,

cooperative choices should not only be solely considered as a choice dictated by contextual circumstances, but as a set of bio-cultural strategies aimed at finding a balance. In other words, we need an ontological approach to the commons as key expression of the complex interactions that constitute the web of life. Such an accomplishment would allow to frame collective action as the result of both bio-evolutionary drives as well as cultural and contextual circumstances. Moreover, it would also allow to politicize the commons beyond the realm of human epistemology, fostering the creation of a political ecology of things (Bennet 2010).

Conclusion

This contribution has explored the potential role of evolutionary biology and the environmental humanities to the study of collective action and to overcoming the limits of commons scholarship set by the socio-biological arguments characterizing Hardin's tragedy of the commons. While it is undeniable that the great narration of human self-centered exceptionalism continues to dominate several spheres of academic and popular knowledge, these critical perspectives possess the potential to redirect our vision of the world towards a non-anthropocentric focus where allegedly *natural* drives such as predation and individual kin selection are mitigated by genetic and ecological factors that value coexistence as an essential pre-condition for life and evolution. Such an effort would allow potential future scholars willingly to explore the fascinating universe of the commons to place their research effort beyond the realm of human epistemology, creating ontologically meaningful narratives tackling the complexity of ecological systems through concepts such as multi-species alliance, symbiogenesis, co-evolution and coexistence. More specifically, this article has analyzed the potential points of contact between commons scholarship and the new approaches proposed by the environmental humanities. Analyzing patterns of collective action in different historical periods by looking at their relation with ecological systems could allow to assess the pivotal role of biological coexistence, well beyond the human sphere. The potential of this critical perspective are striking: a similar approach could allow to consider the historical role of the commons not only as human-centered strategies of survival in different environmental

conditions, but as multispecies alliances emerging from what Timothy LeCain has defined as the constant interrelation between nature and culture (LeCain 2017, 132). While it is undeniable that the history of collective action is riddled with contradictions and conflicting behaviors, the socio-biological trajectories of evolutionary history teach us that coexistence is the result of a delicate ecological mesh characterized by unquantifiable types of interrelations between different actors, in constant struggle to find equilibrium, yet able to create positive mutual systems of check and balance (Russell 2011; LeCain 2017).

Certainly, historical studies addressing the interrelation of collective action and the environmental humanities are the most promising research field, if commons scholarship will embrace its mission to finally shed light on the long shadow of Hardinism and claim a central role on the academic stage as well as in policy-making processes. After all, as observed by Fernand Braudel, “is not the present after all in large measure the prisoner of a past that obstinately survives, and the past with its rules, its differences and its similarities, the indispensable key to any serious understanding of the present?” (1992, 20).

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