filosofia unisinos | Unisinos Journal of Philosophy

ISSN 1984-8234

Filosofia Unisinos
Unisinos Journal of Philosophy
25(3): 1-12, 2024 | e25302
Nome dos editores responsáveis pela avaliação:
Inácio Helfer
Luís Miguel Rechiki Meirelles

Unisinos – doi: 10.4013/fsu.2024.253.02

Article

Mutual Aid and Evolution: the evolutionary theory of Piotr Kropotkin

Apoio Mútuo e Evolução: a teoria evolutiva de Piotr Kropotkin

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ABSTRACT

Science is not value-free. Piotr Kropotkin was a renowned naturalist and became the most widely read anarchist of the 20th century. My aim in this essay is to analyze his evolutionary thought as presented in his main work *Mutual Aid: A Factor of Evolution* (1902). I outline the central theses of Kropotkin's evolutionary theory, placing them in their context and examining them in light of current knowledge. Kropotkin argued that (1) species are not fixed, that is, they change over time; (2) this change does not follow a divine plan; (3) species share a common ancestor; (4) the environment produces and selects advantageous traits in organisms; (5) the "struggle for life" is more beneficial when organisms associate rather than compete; and (6) the advantages of association (mutual aid) give it a progressive role in evolution, providing the basis for ethics and for anarchist communism. The cooperative and progressive nature of Kropotkin's theory offers an excellent model for addressing the role of values in science.

Keywords: competition, cooperation, eclipse of Darwinism, egalitarian values, libertarian socialism, social Darwinism.

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RESUMO

A ciência não é livre de valores. Piotr Kropotkin foi um renomado naturalista, bem como o anarquista mais lido do século XX. Meu objetivo neste ensaio é analisar seu pensamento evolutivo, tal como expresso em sua principal obra *Apoio Mútuo: um fator de evolução* (1902). Eu exponho teses centrais da teoria evolutiva de Kropotkin, situando-as em seu contexto e à luz do conhecimento atual. Basicamente, nosso autor defendia que (1) as espécies não são fixas, isto é, modificam-se ao longo do tempo; (2) essa modificação não segue um plano divino; (3) as espécies possuem um ancestral comum; (4) o ambiente produz e seleciona características vantajosas nos organismos; (5) a "luta pela vida" é mais vantajosa quando os organismos se associam do que quando eles competem entre si; e (6) as vantagens da associação (apoio mútuo) lhe conferem um caráter progressivo na evolução, fornecendo as bases para a ética e para o socialismo anarquista. A natureza cooperativa e progressiva da teoria de Kropotkin oferece um excelente modelo para abordar o papel de valores na ciência.

Palavras-chaves: competição, cooperação, eclipse do darwinismo, valores igualitários, socialismo libertário, darwinismo social.

> *There is a strong anti-idealism in certain quarters of philosophy of science and practical ethics today, which justifies itself in a mistaken reference to being realistic and practical. But there's nothing unreal about the ability of ideals properly formed to guide us toward improving the world, and there is nothing less practical than allowing bad actors and unjust systems to limit your hopes and your aspirations. (Brown, 2020, p. 14)*

> *Without the principle of mutual aid – the legitimate child of anarchy – there is no means of building an Ethics. (Kropotkin to Guillaume, 12 June 1903)*

1 Introduction

Science cannot be understood merely as a set of facts or as a body of theories abstracted from practice and history (Kuhn, 1970). After all, scientific inference cannot be fully captured by formal theories of rationality (Longino, 1990). Science is eminently social in two main senses (Brown, 2020). First, it is a collective process, carried out by groups of scientists rather than by scientists working in isolation. Second, science is social because it is deeply influenced by the broader sociocultural environment in which it is practiced. Therefore, science is a collective and socially situated research activity. In other words, it is produced by communities of researchers and is embedded in society.

Science is also historical, as it develops over time and across generations, carrying traces of its historical period. As Thomas Kuhn (1977) pointed out, the scientific dynamic involves an essential tension between innovation and tradition. If research does not contribute to generating new knowledge, then it holds little value for science. However, if it is innovative without engaging with tradition, or if it is radically heterodox, it is likewise regarded as of little value by the scientific community of its time.

Science is social, historical, has traditions, and is not value-free. Values are needed to make decisions about which research programs to develop, what questions to ask, what models to test, how to collect and characterize data and how to interpret results (Douglas, 2000; Elliott, 2022). Values often act as background assumptions to establish the plausibility of a theory given the evidence (Longino, 1990) or to weigh the sufficiency of evidence against uncertainties (Douglas, 2000, 2009). Because values guide our actions, they should not be seen as dogma and should require critical examination (Brown, 2020).

However, if they are part of a dominant worldview, they are less likely to be examined through empirical research. Even when dominant values are examined, the results of that investigation often take longer to enter the canon of science. This also applies to evolutionary theory. Let me briefly illustrate that point.

Although evolutionists, in the broad sense, have existed since at least Ancient Greece, evolutionary theory only became widely accepted in science in the second half of the 19th century (Bowler, 1983). I am not referring to Darwin and Wallace's theory of natural selection, but simply to the idea that species change over time, giving rise to new species. Why, then, was fixism dominant in universities until the 19th century?

Moreover, the adoption of evolutionism did not mark the end of Christian dogma in science at the time. Despite breaking with fixism, the 19th century saw the emergence of theistic evolution, a research program that advocated evolution guided by God (Bowler, 1983). Why, then, did evolution continue to be linked to Christian dogma?

Until the first decades of the 20th century, evolutionary theory was primarily viewed through the lens of progress. Evolution was often understood not only as a historical process of species diversification, but a progressive process (Ruse, 1996). More recently emerging lineages were seen as "higher", "improved" and "more advanced". For example, vertebrates were considered "more evolved" than invertebrates, and mammals "more evolved" than birds. In many cases, this notion of progress was also tainted of anthropocentrism, as humans (more precisely, white men) were perceived as the "pinnacle" of evolution. Why, then, was evolutionary theory tied to assumptions of progress and anthropocentrism (and even racism and sexism)?

Another example is the centrality of competition in explaining the evolutionary process and the coexistence of species (Simha et al., 2022), a Malthusian legacy that remains influential today. There is no reasonable doubt that competition is a relevant interaction in both Ecology and Evolution. However, research programs in these two areas were, throughout the 20th century, heavily influenced by the Malthusian view of overpopulation, food scarcity, and fierce competition. As we will see, Piotr Kropotkin was a staunch critic of this perspective, advocating mutual aid, or cooperation, as a central evolutionary factor. Like other evolutionists, Kropotkin also integrated values – egalitarian values – into his investigations. However, his book *Mutual Aid* did not enter the canon, unlike the Malthusian view. As Noam Chomsky states, "it's not hard to imagine why." (Kropotkin, 2021, back cover). The competitive view of nature is linked to both masculinity stereotypes (Lowrey, 2015) and dominant political economy assumptions (Orellana, 2023; Vara and Gorostiza, 2024). Why, then, was evolutionary theory structured around a competitive model?

The above questions can be partially answered by recognizing that not all assumptions or values are critically discussed in scientific investigations (Longino, 1990). Moreover, hegemonic assumptions more easily become blind spots (Bueter, 2015), while counter-hegemonic values are often dismissed as ideological (Lacey, 1999). If these assumptions are hegemonic, it means they are widely shared and therefore more likely to be accepted without the need for studies demonstrating their reasonableness (Gould, 1981; Keller and Longino, 1996; Lewontin, 1991). Additionally, hegemonic values are more likely to persist in science, even when studies show their inadequacy. Evolutionary theory is no exception.

2 Kropotkin, social Darwinism, and eugenics

Charles Darwin, the great English naturalist, and Pierre-Joseph Proudhon, the French philosopher and precursor of anarchism, were both born in 1809, in the first decade of the 19th century. The German socialist Karl Marx was born in 1818, and the Russian anarchist Mikhail Bakunin in 1814. They are all from the same generation, immediately preceding that of Piotr Kropotkin (1842 – 1921).

Considered "the prince of evolution" (Dugatkin, 2011), "the revolutionary evolutionist" (Marshall, 2008) and "the most widely read anarchist of the 20th century" (Corrêa, 2021), Kropotkin was a renowned naturalist of Russian aristocratic origin who broke with his class and became one of the leading

exponents of anarchism, that is, of revolutionary and libertarian socialism. He was involved in debates surrounding Darwin's evolutionism after the publication of *On the Origin of Species* (Darwin, 1859), during a period known as the "eclipse of Darwinism" (Bowler, 1983), when different evolutionary theories and research programs coexisted alongside Darwin and Wallace's theory of natural selection.

At this time, evolutionary thought was expanding not only in natural history but also in several other fields, including social theories, with the rise of theories of social evolution. This period saw the emergence of "social Darwinism", in which Darwin's theory was distorted to justify elitist, racist social theories that emphasized the competitive struggle for individual advantage. It was also the period when eugenics emerged, a practice promoted by many scientists with the aim of "perfecting" human genetics. While social Darwinism used the idea of "survival of the fittest" to legitimize social and economic inequality, eugenics employed the notion of improving "genetic quality" to justify policies of population control and discrimination, such as the creation of laws prohibiting interracial marriage and the sterilization of those deemed unfit (Cullen, 2007).

Kropotkin was aware of the distortion that Darwin's theory was undergoing in the hands of social Darwinists, as well as the dangers posed by eugenics. He participated in the first international eugenics congress, held in London in 1912, where he delivered an impassioned speech that reflected a popular sentiment among the Russian intelligentsia (Krementsov, 2015). He spoke out against both the hereditary theory underpinning eugenics and the political proposals of eugenicists (Kropotkin, 1912). Kropotkin criticized what would later become hegemonic among socially inclined naturalists, anthropologists, physicians, and jurists in the following decades. In the year of his speech and the first international congress, in 1912, the United States already had two states, Indiana and California, with sterilization laws based on eugenics. Two decades later, these laws had spread to more than 30 states (Cullen, 2007). Eugenic theories were initially developed in England, their political implementation took shape in the USA, and their horrors reached their peak during Hitler's Nazi government in Germany and the reinforcement of colonialism and racism in different regions of the globe.

However, we will go back a decade in time to focus on Kropotkin's evolutionary theory as set out in his main work, *Mutual Aid: A Factor of Evolution* (Kropotkin, [1902] 2021). The chapters comprise this book were written between 1890 and 1896 and published as articles in the monthly periodical *The Nineteenth Century*. Kropotkin had been in exile in England since 1886, after spending almost four years imprisoned in France on charges of insurrection. He had also been arrested for his activism in 1874 in Russia, his home country, while serving as president of the Department of Physics and Mathematics of the Geographical Society. He managed to escape three years later and lived in exile for 41 years.

3 Kropotkin and the eclipse of Darwinism

The texts that gave rise to *Mutual Aid* were written by Kropotkin during the "eclipse of Darwinism", the period after the publication of *On the Origin of Species* (Darwin, 1859), especially from 1880s to the 1920s, ending with the emergence of the synthetic theory of evolution. During this period, different theories and programs of evolutionary research coexisted in debate. Evolution was already widely accepted among the leading naturalists of the time, but there were significant discussions about the mechanisms responsible for the evolutionary process, with disagreements over whether natural selection was the primary mechanism. According to Peter Bowler (1983), a historian specializing in the debates of this period, five main theories were articulated and defended in various ways: the theory of natural selection, theistic evolution, Lamarckism, orthogenesis, and mutation theory. Based on Bowler (1983) and in view of the objectives of this essay, we can briefly summarize each theory as follows.

Theory of natural selection. This theory posits the survival and differential reproduction of individuals born with small differences in characteristics that provide them with certain adaptive advantages in

response to environment demands. It was assumed that variation was produced randomly, without any relation to the environment.

Theistic evolution. In the early years of the Darwinist debate, theistic evolution was supported by scientists with strong religious convictions, who believed that variation could be directed toward an objective determined by the will of the Creator.

Lamarckism. In the late 19th century, Lamarckism represented mainly one aspect of Jean-Baptiste Lamarck's theory: the inheritance of acquired characteristics. In this theory, characteristics acquired during an organism's life are passed on to its offspring.

Orthogenesis. This theory indicates that evolution is directed in a specific direction by forces originating within the organisms themselves. These tendencies develop without any relation to the demands of the environment and can even lead to extinction.

Mutation theory. This theory holds that evolution occurs through the sudden appearance of new significant forms. Mutations are considered random and are not adaptive, although many naturalists believed they could give rise to new species.

This brief exposition is sufficient for the first objective of this essay: to analyze Kropotkin's theory in relation to the theories debated during this period of the eclipse of Darwinism. First, Kropotkin's theory does not follow a program that accepts supernatural causes, thereby distancing itself from theistic evolution. His attention turns to evolutionism as a means of further developing the naturalist worldview and advancing exclusively naturalist explanations.

Kropotkin also did not focus his attention on mutation theory. We can assume that this was because mutationism did not convincingly explain the complex adaptations of living beings to their environment, a central concern for the Russian naturalist. Orthogenesis was likewise not a focus for Kropotkin. In this theory, evolution followed a natural tendency controlled internally by organisms, without any relation to the environment. In contrast, for Kropotkin, the environment guided species modification. The "struggle for life", central to Darwin's theory, is also a foundation of Kropotkin's theory.

I argue that Kropotkin's evolutionary theory integrates elements of Darwinism and Lamarckism. Kropotkin accepts Darwin and Wallace's theory of natural selection, but he does not assume that variations occur randomly, irrespective of the environment. He accepts the inheritance of characteristics acquired during the life of organisms. Darwin also accepted this theory, which was not exclusive to Lamarck. However, unlike Lamarck and Kropotkin, Darwin advocated that natural selection acting on random variation was the primary mechanism of evolution. In addition, as we will see, there are other Lamarckian aspects to Kropotkin's theory. These include the view of the evolutionary process as a natural tendency toward increasing complexity, as a regular pattern of development, and as progressive evolution.

4 Kropotkin, Spencer, and Huxley

The British intellectual Herbert Spencer was a central author in the evolutionist debate of the time and a popularizer of social Darwinism. He was an important influence on Kropotkin (Adams, 2016; Todes, 1989), particularly due to his search for a synthetic philosophy and his belief that nature provides a model for morality. However, Kropotkin's view of nature, human nature, and society is radically different from that of social Darwinists like Spencer and Thomas Huxley – another prominent English evolutionist, publicly known as Darwin's "bulldog". For these thinkers, nature followed an individualistic and competitive model. In contrast, for Kropotkin, cooperation, mutual aid, and sociability are the key to understanding the tendencies of the evolutionary process and its progressive factors.

The vision of moral progress inherent in evolution is shared by both Spencer and Kropotkin, but not by Huxley (Eddy, 2010; Gould, 1980). Huxley denied that nature provides lessons about morality,

strengthening a dualist view of nature and ethics. In his famous article "Evolution and Ethics" (1893), Huxley establishes an absolute dichotomy between the "cosmic process" (the evolution of life) and the "ethical process" (the moral life of humanity). Kropotkin's naturalism did not accept this dualistic view and therefore sought the origins of moral sentiment in nature itself (Morris, 2002).

While Spencer and Huxley emphasized competition to justify capitalist industrial society, Kropotkin emphasized mutual aid to understand the origins of ethics (Morris, 2002) and to advocate for anarchist communism in opposition to the rise of social democracy and individualism (Kinna, 1995). Moreover, Kropotkin viewed the advances of industrial society as driven by mutual aid, without, however, justifying private property, hierarchies of power, and "wage slavery". The section below outlines what I consider to be the main theses of Kropotkin's evolutionary theory. Let's briefly analyze each of them.

5 Main theses of Kropotkin's evolutionary theory

5.1 Species are not fixed, they change over time

This thesis opposes fixism, is shared by all evolutionists, and has had its proponents since at least Ancient Greece. Even so, it contradicts the views of Aristotle and Plato and the various fixist theories that survived the Middle Ages and persisted into modernity through natural theology. Key figures at major European universities, including in England, who were contemporaries of Darwin — such as the prominent paleontologist Richard Owen — were fixists. However, by the last decade of the 19th century, when Kropotkin wrote the essays that would form the book *Mutual Aid*, fixism was no longer a viable alternative, and the discussion revolved around different evolutionary theories (Bowler, 1983). Therefore, in defending the evolutionist thesis that species are not fixed, Kropotkin was largely in agreement with the leading figures in this debate.

5.2 The modification of species does not follow a divine plan

This thesis opposes theistic evolution. By the time Kropotkin wrote his essays, fixism was no longer discussed among leading empiricist-inclined researchers. However, theistic evolution was still considered a viable alternative, at least until the turn of the 20th century (Bowler, 1983). Kropotkin distanced himself from this perspective by arguing that the evolutionary process is entirely explained by natural causes, denying scientific legitimacy to the theistic worldview, even if it was evolutionary. Kropotkin's evolutionism is part of his naturalized view of the world and of ourselves.

5.3 Species share a common ancestor

This thesis opposes the fixist theory of independent acts of creation and evolutionary theories that assumed multiple independent lineages without a shared ancestor, like Lamarck's theory. In contrast, Kropotkin's evolutionism accepts that many similarities between species are a consequence of their common origin. This is a central inference of Darwinian evolutionism (Bowler, 1983). It is not a direct observation, nor one that can be made with the aid of observation or detection instruments. Rather, it is an inference to the best explanation — an inference that dramatically increases the explanatory and unifying power of the theory in accounting for the similarities between species and the presence of vestigial structures. It is true that not all similarities are due to a common origin; not all are homologies. Some similarities are related to adaptation to the environment, as in the resemblance between the wings of a butterfly and a bat. However, the similar number of bones in the human hand, the paw of a cat, the flipper of a whale, and the wing of a bat are traces of evolution, if we accept the validity of

the inference to a common origin. We may be wrong, as human knowledge is fallible, but this inference has generated so many confirmed predictions and has guided research so fruitfully that, according to Kropotkin, it deserves the epistemic value of truth. Thus, in addition to being a naturalist, Kropotkin was a realist about scientific theories.

5.4 The environment produces and selects advantageous features in organisms, groups, and species

This thesis opposes mutationism and orthogenesis. In both theories, the evolutionary process is directed by internal forces within the organisms themselves. In contrast, Kropotkin accepts the argument of utility, that evolution guides organisms to better adapt to the environment, preserving these organisms and increasing their offspring. However, unlike Darwin, Kropotkin does not apply the supposed Malthusian law of overpopulation and fierce competition. Kropotkin's Darwinism is anti-Malthusian, as was the Russian evolutionary thought of his time (Girón, 2003; Todes, 1989). Further distancing himself from Darwin, Kropotkin did not consider random variation selected by the environment, but rather the direct action of the environment on variation. The environment not only selects but also produces hereditary variations. Although this idea is strongly Lamarckian, a more nuanced version has gained prominence in recent years, especially with the so-called Extended Evolutionary Synthesis (Laland et al., 2015). This proposal considers extragenetic inheritance, development plasticity, and niche construction as causes of evolution and not merely products (Dos Reis and Araújo, 2020). Thus, the environment makes certain hereditary variations more likely than others. Natural selection does not act on random genetic variation, but on environmentally induced phenotypic variation. In this thesis, Kropotkin also diverged from Darwin by considering that the environment does not only select organisms, but also groups and species. Group and species selection remains a topic of debate in evolutionary biology today (Shavit & Millstein, 2008; Vrba, 1984).

5.5 The "struggle for existence" is more advantageous when organisms cooperate rather than compete, so mutual aid tends to be naturally selected

This thesis suggests the superior adaptive nature of mutual aid over competition. Furthermore, it contradicts to the Hobbesian and Malthusian view of evolution, as defended by English Darwinists, including Thomas Huxley. As a naturalist, Kropotkin believes that science should play an important role in shaping our theories about the world and about ourselves. In this philosophical sense of naturalism, scientific theories should constrain philosophical theories. However, some so-called scientific theories can reproduce ideologies, manifesting false and widely shared assumptions due to a socially dominant view. This is the main criticism that Kropotkin directs at the English Darwinists and, to some extent, at Darwin as well. He pointed out that Darwin himself grouped together under the label of "struggle for existence" many different phenomena and that this "struggle" was mainly metaphorical. Therefore, when "struggle for existence" is interpreted strictly as direct competition between individuals, Kropotkin views this interpretation as a product of the exaggerated individualism common among these Darwinists. He is deeply critical of this "gladiatorial" view of nature, as defended by Huxley. Kropotkin cites his own field observations in Siberia and Manchuria, as well as those of several traveling naturalists, as evidence that the struggle of one against all was not a generalizable natural phenomenon. For Kropotkin, the struggle for existence primarily means the "struggle" of organisms against a hostile environment, and cooperation is a highly advantageous means of this struggle. Kropotkin accepts both competition and mutual aid as laws of nature. However, he argues that exercising mutual aid provides more advantages to organisms than becoming a superior competitor. Since mutual aid is more advan-

tageous than competition, it tends to be naturally selected. This thesis is currently debatable insofar as it asserts a tendency in the evolutionary process towards mutual aid. The thesis assumes that cooperation will be naturally selected as an evolutionarily stable strategy, which is not always the case. As Darwin rightly observed, in many situations other strategies may offer organisms a greater evolutionary advantage than cooperation. In fact, the evolution of altruism (cooperation, mutual aid) was an enigma for Darwinian theory. The evolutionary problem of altruism began to be solved only many decades later, with the theories of kin selection (Hamilton, 1964) and reciprocal altruism (Trivers, 1971). However, these theories removed the altruistic motivation for altruism (de Waal, 2008). Evolutionary explanations for empathy-induced altruism have been accepted only in recent years, primarily through the works of Frans de Waal (2008).

5.6 Evolution is a historical process that follows a regular pattern of development

This thesis opposes the Darwinian theory that the evolutionary process is irregular and branches out like a tree without ceasing. Kropotkin sees evolution as a directional process, which presents a developmental tendency toward sociability. He speaks of an "everworking tendency towards association and mutual support" (Kropotkin, 2021, p. 211). The Russian naturalist traces the origins of mutual aid in invertebrates, such as termites, ants, and bees, and even suggests that "we must be prepared to learn some day, from the students of microscopical pond-life, facts of unconscious mutual support, even from the life of microorganisms." (Kropotkin, 2021, p. 35). Indeed, today we know of many cases and mechanisms of cooperation among microorganisms. Two prominent scientific articles that together have accumulated more than two thousand citations address this topic as "theory of social evolution for microorganisms" (West et al., 2006) and "cooperative self-organization of microorganisms" (Ben-Jacob et al., 2000). Kropotkin's prediction has been empirically confirmed, demonstrating the fertility of his theory. But he goes further by inferring a natural teleology toward cooperation. In this way, evolution is a historical process that advances through a regular pattern of development, with the increasingly fuller and more conscious manifestation of mutual aid as we "climb the scale of evolution". Since he interprets evolutionary trends through the lens of progress, mutual aid offers not only regularity and predictability, but also progress in the evolution of species.

5.7 Evolution is a progressive historical process

This thesis views evolution from the perspective of progress, seeing it as the passage through different stages, each one more advanced. For Kropotkin, however, there are advances and reversals (in the practice of mutual aid) across different evolutionary stages. For example, mammals are seen as belonging to a more advanced evolutionary stage than birds, but some species of mammals may be less sociable than some species of birds. Even so, he states that the most sociable species are the best adapted and, therefore, they "prosper, while the unsociable species decay" (Kropotkin, 2021, p. 82). Although not based on biological evolution, August Comte's positivism viewed history from the perspective of progress. Later, Herbert Spencer would maintain the assumption of progress, but would base it on biological evolution. Kropotkin did the same, but with a view of nature, progress, and society very different from Comte and Spencer. Although he shared Spencer's view that nature should serve to justify a future model of society, Kropotkin saw the progressive factor of evolution through the theory of mutual aid and fought against the Malthusian theory of competition and naturalization of capitalism. Mutual aid is not only a factor of evolution, as the title of the book suggests, but a factor of progress. Darwin avoided this equivalence, naming his proposal "theory of descent with modification" rather than a theory of

evolution. Even so, Darwin did not keep his theory completely dissociated from his vision of progress. There are passages in which he seeks to provide a biological justification for European colonialism, particularly in *The Descent of Man* (Darwin, 1871). In this work, he developed the concepts of inter-racial competition and racial extinction, proposing that encounters between "civilized" and "savage" nations often led to the extinction of the native race due to new habits, new vices, and new diseases (Sepulveda et al. 2023). Kropotkin also engaged with colonial discourses, but he "turned dominant civilization narratives on their head." (Kinna, 2021, p. 11). Although he presented "savage" and "barbarian" communities in a progressive series leading to the medieval city-state, his account of history was not linear (Adams, 2011). According to Ruth Kinna, Kropotkin noted that the medieval "city-state was remarkable but a failure: it gave rise to the modern colonising European state. In contrast, the [barbarian] village community stimulated the medieval city and persisted well after its collapse" (Kinna, 2021, p. 11). It is not surprising that Kropotkin's progressive account of history was not linear. After all, he did not see the emergence of the state and private property as progress — quite the opposite.

5.8 The advantages of cooperation indicate that it is an evolutionary and progressive factor

This thesis is closely associated with the previous one. Evolution represents both a historical process of species diversification and a progressive process. For Kropotkin, cooperation is advantageous in any environment. Sociable species represent progress in relation to non-sociable ones because they are better able to deal with the environment, they are better at the "struggle for life". Kropotkin is correct in stating that Darwin saw human sociability as a relevant factor for the increase in cognitive capacity and morality. The difference, however, is that Darwin did not believe that cooperation was an adaptation in all environments. For Darwin and for current evolutionary biology, adaptation is intimately connected to the local environment in which the organism lives — a trait that is adaptive for many organisms in many environments cannot be generalized as adaptive for all environments, as Kropotkin does. The English Darwinists made a similar mistake by universalizing competition. However, the Russian anarchist is primarily interested in the moral progress of the human species, dedicating most of his book to the analysis of human societies. And it is difficult to deny the role that cooperation played in our cognitive advancement and in the origin of moral feelings (de Waal, 2008; Dugatkin, 2006). Kropotkin's analyses on this point are insightful. Even so, the claim of an evolutionary teleology that leads to moral progress through cooperation is not justified by current knowledge. Evolution is neither progressive nor directional in that way. It is irregular, branching, and highly contextual. However, the progressive view of evolution was a background assumption shared by evolutionists until the first decades of the 20th century. Kropotkin was also a man of his time.

6 Final considerations

"Naturalist" is a term that is often used in two main senses: as a synonym for natural historian and as an equivalent to naturalistic philosopher. Kropotkin, like Darwin, was a naturalist in both senses. In addition, he was a social historian. *Mutual Aid* is a work that combines natural and social history, united by the idea of change and the centrality of cooperation in human and animal societies. Kropotkin was interested in exploring the origins of moral feelings — via the theory of mutual aid — and their role in social life. It is in this sense that *Mutual Aid* provides the basis for a naturalistic ethical theory, which would later be developed in his posthumous and unfinished *Ethics* (Kropotkin, 1924). For Kropotkin, morality should not be treated as an autonomous domain, completely independent of the material world and social life, but rather as an attempt to delineate the origins of moral feelings and the role that morality plays in social life (Morris, 2002). This characterizes Kropotkin's ethical naturalism.

In this way, his ethical-political project is rooted in nature, more specifically, in the historical evolutionary process. However, Kropotkin did not see moral or social progress — nor anarchism — as an inevitable outcome of the historical process (Adams, 2011). Revolutionary activity remained essential. Unlike Spencer, who saw capitalist society as a product of evolutionary development and, consequently, dismissed human attempts to reorder it, Kropotkin understood social reordering as an urgent need (Adams, 2011). For him, humans are no exception and are also subject to the law of mutual aid. However, its broader manifestation is not guaranteed; it depends on the destruction of authoritarian institutions, such as private property and the State, which are sustained by the supposed inability of human beings to establish, without domination, rules of coexistence that are increasingly ethical and progressive.

Kropotkin does not draw his conclusions about human beings exclusively from considerations of non-human animals. Two-thirds of his book is dedicated to the analysis of the organization of human societies, with archaeology, anthropology (especially comparative ethnology), and social history (approached from below) as central sources. From these sources, Kropotkin argues extensively that "sociability and need of mutual aid and support are such inherent parts of human nature that at no time of history can we discover men living in small isolated families, fighting each other for the means of subsistence." (Kropotkin, 2021, p. 132). There is no doubt that *Mutual Aid* is a very rich book, with cogent arguments and a profusion of empirical examples of sociability.

While Kropotkin was articulating his theory, English Darwinists were developing a "gladiator" view of nature, in which living beings were nothing more than Malthusian competitors. Malthus' influence was being taken too far. After all, cooperation may be the best strategy for gaining survival and reproduction advantages in an environment. Like other Russian evolutionists, Kropotkin was highly critical of Malthus. As an anarchist revolutionary, he saw in Malthus an elitist theory that justified poverty, oppression, and social inequality.

In *Mutual Aid*, Kropotkin articulates an evolutionary theory that aims to justify a naturalistic ethics and anarchist communism. He seeks this justification on the basis that mutual aid: (1) is inherent in human and animal nature, (2) is an advantageous feature in the struggle for survival, and (3) leads to social, cognitive, and moral progress. It is evolutionary theory, interpreted from the perspective of progress, that will allow him to establish these connections and consequently strengthen the reasonableness of the anarchist ideal. However, it is not necessary to accept the progressive view of evolution to appreciate the richness and depth of Kropotkin's theorizing, including his naturalistic ethics and the relevance of his political ideas. Furthermore, his criticism of the centrality of competition in evolutionary, ecological, and political economy models remains extremely relevant today. Kropotkin reminds us that science is socially situated and still linked to hegemonic values, while also helping us to recognize the role of egalitarian and counter-hegemonic values in science[2].

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[2] **Acknowledgements:** I would like to thank the anonymous reviewers and my friend, Ruãn Batista, philosopher of biology at UFBA, for their suggestions on this work, as well as my friend Paulo Barradas for the English review.

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Submetido em 19 de outubro de 2023.

Aceito em 01 de agosto de 2024.