Cooperation versus competition in nature and society: The contribution of Piotr Kropotkin to evolutionary theory

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Concepts usually have multiple lives, yet in their revival they occur in a changed context, due to the time passed or to their application within a different disciplinary approach. Mutual aid, in its contemporary avenues, seems to be one of them.

In 1902 Piotr Alekseevich Kropotkin published the seminal text *Mutual Aid: A Factor of Evolution*, proposing the principle of mutual support both as a law of nature and a factor of evolution. The volume is, actually, a compilation of an earlier series of articles published in *The Nineteenth Century* from September 1890 to June 1896. The alleged motivation for writing was the publication in the same periodical in 1888 by Darwinist Thomas Henry Huxley of the opus *Struggle for Existence and its Bearing upon Man*. The emphasis placed by Huxley on translating struggle for life as competition to explain one of the three pillars of the theory of evolution—survival of the fittest—pushed Kropotkin to react. He not only was supporting his social theory but was also contributing the results obtained from his exploring expeditions.

The birth and growth of Russian geography as a discipline was closely associated to the expansion of the Russian Empire to the Pacific Ocean throughout Siberia and Central Asia. Peter the Great, in the 18th century, promoted multiple expeditions to survey the country's natural resources (Hooson 1968) and, gradually, dominate increasingly vast territories. Travel, carto-

graphic survey, and narratives served both the scientific interests of the academy and the political interests of the imperialist tsarist system. Kropotkin, as a military person, served these interests as well.

Kropotkin extensively travelled and explored throughout Eastern Siberia and Northern Manchuria and learned about the complex relationships between man and nature, and about the adaptation of multiple species to those harsh environments. His early anarchist activism as a writer and the label of revolutionist have—since the beginning—eclipsed an experienced and long-lived field work which allowed him to gain a deep understanding of boreal and steppe ecosystems. However, one of the major theoretical contributions of Kropotkin was in the field of evolutionary theory, suggesting that cooperation within a group explains natural selection of species more satisfactorily than competition—proposed by Darwin but augmented by multiple seminal exegetes—between individuals, although not excluding the role of the former process. The circumstance that both the articles and the book were published in English by a western publisher—together with the ideological leadership of Kropotkin—meant that his work was not largely ignored as happened with many other authors from the Russian school of thought in evolutionary theory (Lapenis 2002).

COOPERATION AS A LAW OF NATURE AND A FACTOR OF EVOLUTION

In his introduction to the revised edition of *Mutual Aid, a Factor of Evolution* in 1902 Kropotkin enlarged the original title to *Mutual Aid as a Law of Nature and a Factor of Evolution*, laying emphasis on the basic principle proposed. Kropotkin not only pairs it to the law of mutual struggle but attributes it much greater importance:

> ...we may safely say that mutual aid is as much a law of animal life as mutual struggle, but that, as a factor of evolution, it most probably has a far greater importance...
>
> Sociability is as much a law of nature as mutual struggle... (Kropotkin 1902, n.p.)

Indistinctly, sometimes he refers to mutual aid or, at times, to sociability. He understands that species are determined to live

in society, and suggests that sociability has an innate character and is not an exception:

> Sociability that is, the need of the animal of associating with its like...
>
> ...life in societies is no exception in the animal world; it is the rule, the law of Nature... (Kropotkin 1902, n.p.)

Sociability is neither exclusive to nor has its origin in the human species, nor are social animals building complex societies—such as ants and bees—the only suitable examples, for Kropotkin judges other species' behavior as purposeful and the result of the historical process of evolution:

> The more strange was it to read in the previously-mentioned article by Huxley the following paraphrase of a well-known sentence of Rousseau: "The first men who substituted mutual peace for that of mutual war whatever the motive which impelled them to take that step created society" (*Nineteenth Century*, Feb. 1888, 165). Society has not been created by man; it is anterior to man.
>
> ...it is not imposed, as is the case with ants and bees, by the very physiological structure of the individuals; it is cultivated for the benefits of mutual aid... (Kropotkin 1902, n.p.)

Despite his fierce reaction against the arguments of Thomas Henry Huxley in favor of competition, his support of cooperation is not basically naïve, because he also argues against the harmonic view built by Rousseau:

> But it may be remarked at once that Huxley's view of nature had as little claim to be taken as a scientific deduction as the opposite view of Rousseau, who saw in nature but love, peace, and harmony destroyed by the accession of man.
>
> ...neither Rousseau's optimism nor Huxley's pessimism can be accepted as an impartial interpretation of nature. (Kropotkin 1902, n.p.)

Although he believes evolutionists—including Herbert Spencer—might accept his theory, he also believes Spencer would not accept it to be applicable to humankind, for Kropotkin understands that sociability develops increasing complexity and ultimately consciousness. Thus, he considers conflict would be the preferred interpretation of earlier human societies:

> Association is found in the animal world at all degrees of evolution; and, according to the grand idea of Herbert Spencer, so brilliantly developed in Perrier's *Colonies Animales*, colonies are at the very origin of evolution in the animal kingdom. But, in proportion as we ascend the scale of evolution, we see association growing more and more conscious.
>
> ...there are a number of evolutionists who may not refuse to admit the importance of mutual aid among animals, but who, like Herbert Spencer, will refuse to admit it for Man. For primitive Man they maintain war of each against all was the law of life. (Kropotkin 1902, n.p.)

Piotr Kropotkin became acquainted with the concept of mutual aid in 1883 after Karl Fiodorovich Kessler, who first proposed it in a lecture in January 1880. According to Kropotkin the co-operation-based evolution paradigm was generally accepted in Russian Darwinism:

> Kessler's ideas were so welcomed by the Russian Darwinists, whilst like ideas are not in vogue amidst the followers of Darwin in Western Europe. (Kropotkin 1902, n.p.)

On the contrary, Todes (1989) finds an almost general rejection of the political doctrine formulated by Thomas Robert Malthus in Russian Darwinism, and Kropotkin is not an exception. This is due, according to Todes, to the challenging and difficult assumption of a western-culture concept—struggle for existence—by an eastern culture with a very dissimilar social structure, political history and environmental conditions.

> Because political, linguistic, and cultural barriers existed between Russia and the rest of the world through most of the twentieth century, many of their concepts—with the possible exception of ideas by Kropotkin—are not well known in Western science. On the other hand, some of their ideas are considered to be common knowledge and are not associated with the names of these scientists, who first introduced them. (Lapenis 2002)

Accordingly, cooperation is a concept born in eastern evolutionary thought led by the pair Kessler-Kropotkin. Although it should be noted the key role of German-origin academics in the Russian intelligentsia and in putting up Russian universities at that time.

Kropotkin seemingly agrees with the standard formulated principle of struggle for life because he incorporates the term profusely, but he offers a completely different interpretation of

its outcome, questioning its operation through competition and who is the survivor: "Life is struggle; and in that struggle the fittest survive" (Kropotkin 1902, n.p.).

He recognizes competition among plants but not amongst animals, who can move or migrate. Thus, migration acts as a vent to relieve pressure in view of resource scarcity and to avoid clashes:

> However severe the struggle between plants and this is amply proved we cannot but repeat Wallace's remark to the effect that "plants live where they can," while animals have, to a great extent, the power of choice of their abode.
>
> The importance of migration and of the consequent isolation of groups of animals, for the origin of new varieties and ultimately of new species, which was indicated by Moritz Wagner, was fully recognized by Darwin himself.
>
> Most of our birds slowly move southwards as the winter comes, or gather in numberless societies and undertake long journeys and thus avoid competition.
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Or, instead, species can adapt to new food sources:

> It is known that portions of a given species will often take to a new sort of food. (Kropotkin 1902, n.p.)

Particularly the new-born, who need to find their niche:

> The new-comers went away before having grown to be competitors. It is evident that if such is the case with men, it is still more the case with animals. (Kropotkin 1902, n.p.)

This view was opposite to that of Darwin, who "maintained a limited but controlling view of ecology as a world stuffed full of competing species—so balanced and so crowded that a new form could only gain entry by literally pushing a former inhabitant out" (Gould 1997, n.p.).

Kropotkin deems competition not sufficiently documented by Charles Darwin—or his contemporary Alfred Russel Wallace—who did not provide conclusive examples of its operation, for they illustrate the principle with domesticated species:

> But when we look in his work for real proofs of that competition, we must confess that we do not find them sufficiently convincing.
>
> ...its value is impaired by its being taken from among domesticated animals. (Kropotkin 1902, n.p.)

In his argumentation he is very careful to avoid departure from mainstream Darwinism and argues that the term struggle for life is used both by Darwin and Wallace in a metaphorical sense, aligned with his acceptance of the principle of struggle for life:

> The term "struggle for life" is again used in its metaphorical sense, and may have no other.
>
> ..."struggle for existence," evidently applies to the word "extermination" as well. It -can by no means be understood in its direct sense, but must be taken "in its metaphoric sense."
>
> As to "competition," this expression, too, is continually used by Darwin (see, for instance, the paragraph "On Extinction") as an image, or as a way-of-speaking, rather than with the intention of conveying the idea of a real competition between two portions of the same species for the means of existence. (Kropotkin 1902, n.p.)

It was not until Darwin wrote *The Descent of Man, and Selection in Relation to Sex* in 1871 that he provided examples of various other species and finally elaborated his own view of the concept of struggle for live. Glassman (2000) believes that Darwin's focus on competition allowed him to neglect the existence of cooperation. According to Kropotkin, Darwin considers competition to be intraspecific:

> The idea which permeates Darwin's work is certainly one of real competition going on within each animal group for food, safety, and possibility of leaving an offspring. (Kropotkin 1902, n.p.)

But the examples provided are—yet again for Kropotkin—not sufficiently illustrative to derive a general law:

> The struggle between individuals of the same species is not illustrated under that heading by even one single instance: it is taken as granted; and the competition between closely-allied animal species is illustrated by but five examples, out of which one, at least (relating to the two species of thrushes), now proves to be doubtful. (Kropotkin 1902, n.p.)

And although Kropotkin accepts a low-intensity competition for resources limited in time: "there is, within each species, a

certain amount of real competition for food at least, at certain periods" (Kropotkin 1902, n.p.). He alleges not having found any examples of intraspecific competition: "I failed to find struggle for the means of existence, among animals belonging to the same species" (Kropotkin 1902, n.p.).

Instead, Kropotkin relies on group selection, according to the dominant explanatory paradigm in the first half of the 20th century (van Schaik and Kappeler 2006). Although Kropotkin greatly emphasizes the role of cooperation he does not completely exclude competition nor does he oppose natural selection, and understands that both operate simultaneously, "competition is not the rule either in the animal world or in mankind" (Kropotkin 1902, n.p.).

According to Gould (1997) this was the main contribution made by this thinker to the evolutionary theory. Kropotkin did not radically opposed Darwinism but widened its scope, identifying the significance of a complementary but lessened mechanism. And, if he overemphasized cooperation, "most Darwinians in Western Europe had exaggerated competition just as strongly" (Gould 1997), and "therefore created a dichotomy within the general notion of struggle – two forms with opposite import: (1) organism against organism of the same species for limited resources, leading to competition; and (2) organism against environment, leading to cooperation" (Gould 1997, n.p.). Kropotkin understands that struggle takes place between the group and a changing environment that threatens survival:

> One species succumbs, not because it is exterminated or starved out by the other species, but because it does not well accommodate itself to new conditions, which the other does. (Kropotkin 1902, n.p.)

He contends competition does not satisfactorily explain which individuals survive, while the principle of cooperation satisfactorily explains the survival of a variety of groups, since species may benefit more from their sociability than from their physical aptitudes:

> ...the fittest are not the physically strongest, nor the cunningest, but those who learn to combine so as mutually to support each other, strong and weak alike, for the welfare of the community.
>
> The fittest are thus the most sociable animals, and sociability appears as the chief factor of evolution, both directly, by securing the

> well-being of the species while diminishing the waste of energy, and indirectly, by favouring the growth of intelligence.
>
> Those species which willingly or unwillingly abandon it are doomed to decay; while those animals which know best how to combine, have the greatest chances of survival and of further evolution, although they may be inferior to others in each of the faculties enumerated by Darwin and Wallace, save the intellectual faculty.
>
> ...we maintain that under any circumstances sociability is the greatest advantage in the struggle for life. (Kropotkin 1902, n.p.)

Kropotkin opposes the principle of the survival of the fittest, a term coined by Herbert Spencer but not adopted by Darwin until the fifth edition of his work *The Origin of Species* in 1869, after having been convinced by Alfred Russel Wallace (Leonard 2009):

> Those who survive a famine, or a severe epidemic of cholera, or small-pox, or diphtheria, such as we see them in uncivilized countries, are neither the strongest, nor the healthiest, nor the most intelligent.

In some way his argumentation seems to be inspired by religious or moral values, advancing some of the ethical principles later compiled in his work *Ethics: Origin and Development*, published posthumously in 1924:

> The higher conception of "no revenge for wrongs," and of freely giving more than one expects to receive from his neighbours, is proclaimed as being the real principle of morality
>
> ...even the new religions have only reaffirmed that same principle. They found their first supporters among the humble, in the lowest, downtrodden layers of society, where the mutual-aid principle is the necessary foundation of every-day life... (Kropotkin 1924, n.p.)

Thus, Kropotkin explicitly manifested his agreement with the theory of evolution proposed by Charles Darwin, regardless of his critical perspective of competition as a motor of change, but belligerently wrote against his epigones:

> It happened with Darwin's theory as it always happens with theories having any bearing upon human relations. Instead of widening it according to his own hints, his followers narrowed it still more. (Kropotkin 1902, n.p.)

He firmly opposed both Malthus and Huxley—but particularly the first, despite the trigger of the series of papers being

Huxley's writing—because he believed the notion of competition grew from Malthusianism. In the same vein, he contended Malthus led Darwin to a powerful, and ultimately erroneous, view of the factors of evolution, "originated from the narrow Malthusian conception of competition between each and all" (Kropotkin 1902, n.p.).

His basic argumentation against Malthusianism is grounded in the role of the environment, and the climatic conditions above all, as a principal limiting factor, while diminishing the influence of the scarcity of resources.

THE ENVIRONMENT AS A FACTOR OF EVOLUTION

Kropotkin is optimistic for he observes that in extensive geographical areas competition is not observed, since there are sufficient resources available:

> The actual numbers of animals in a given region are determined, not by the highest feeding capacity of the region, but by what it is every year under the most unfavourable conditions. So that, for that reason alone, competition hardly can be a normal condition; but other causes intervene as well to cut down the animal population below even that low standard.
>
> ...we can safely say that their numbers are not kept down by competition; that at no time of the year they can struggle for food, and that if they never reach anything approaching to over-population, the cause is in the climate, not in competition...
>
> "Don't compete! competition is always injurious to the species, and you have plenty of resources to avoid it." (Kropotkin 1902, n.p.)

However he did not develop his idea much further, as Todes (1989) observes. Kropotkin understands the important role of the environment as a driver of species evolution, only tempered by cooperation among individuals, and he illustrates it with examples from human society and social animals:

> We understood them as continued endeavours as a struggle against adverse circumstances for such a development of individuals, races, species and societies...
>
> Sociability thus puts a limit to physical struggle, and leaves room for the development of better moral feelings. (Kropotkin 1902, n.p.)

Hence, he understands struggle for life as *struggle against nature*, with species confronting variability and extreme changes in the form of natural hazards:

> ...physical changes are continually going on in every given area...
>
> For industrial progress, as for each other conquest over nature, mutual aid and close intercourse certainly are, as they have been, much more advantageous than mutual struggle. (Kropotkin 1902, n.p.)

Disasters periodically cause loss of lives, controlling population sizes, a factor not sufficiently taken into account by Malthus, and therefore diminishing the validity of his principle of overpopulation:

> ...against an inclement Nature enormous destruction of life which periodically results from natural agencies...
>
> The importance of natural checks to over-multiplication, and especially their bearing upon the competition hypothesis, seems never to have been taken into due account. (Kropotkin 1902, n.p.)

The dimension of environmental changes exceeds in most cases human capacity to dominate nature, showing that this cannot be tamed:

> However, it is unfortunately characteristic of human nature gladly to believe any affirmation concerning men being able to change at will the action of the forces of Nature (Kropotkin 1902, n.p.)

But, conversely, environmental change also turns into an opportunity, because it weakens competitors:

> Each storm, each inundation, each visit of a rat to a bird's nest, each sudden change of temperature, take away those competitors which appear so terrible in theory. (Kropotkin 1902, n.p.)

And this is how environmental variability does not have an exclusive role in evolution because, if this were the case, instead of progression there would be regression:

> But if the evolution of the animal world were based exclusively, or even chiefly, upon the survival of the fittest during periods of calamities; if natural selection were limited in its action to periods of exceptional drought, or sudden changes of temperature, or inundations, retrogression would be the rule in the animal world. (Kropotkin 1902, n.p.)

His approach is aligned with that prevailing in the Russian school of Geography—Kropotkin was himself not only a natu-

ralist or a geographical explorer but a geographer, in the scientific context of the 19th century—concerned about the transformations of natural landscapes and about the impact of man on nature (Hooson 1968). Todes (1989) argues that Kropotkin saw himself as a successor of a tradition that ranged across various ideological stances. The large and sparsely populated land of Siberia was being explored, mapped and settled, steered by a sustained Russian policy since the 18th century, and those untouched natural landscapes would become eventually dramatically transformed. In this scholarly tradition, climate is considered to be the primary factor, according to Kropotkin, "the cause is in the climate, not in competition" (Kropotkin 1902, n.p.).

Almost all Russian Darwinists agree on a radical refutation of the Malthusian standpoint on the role of overpopulation in evolution through competition (Todes 1989), understanding that overpopulation had not a *raison d'être* in an outsized Russian back country (Gould 1991), and recognizing that "Malthus makes a far better prophet in a crowded, industrial country professing an ideal of open competition in free markets" (Gould 1991, 333). In this vein *Mutual Aid, a factor of evolution* came to synthesize mainstream Russian criticism (Gould 1991).

KROPOTKIN AND SOCIAL DARWINISM

Some may argue Kropotkin's reaction was against social Darwinism, but Leonard (2009) contends that he could not oppose it because social Darwinism had almost no currency before 1916. The paradox, according to Leonard, is that when Richard Hofstadter declared social Darwinism an extinct social philosophy, the term began to gain an unexpected vigor that it did not have during its pretended dawn and maturity. Hence, although both Kropotkin and Hofstadter opposed social Darwinism, the first did not deny the translation of Darwinism to social ideology, while the second firmly opposed its applicability to social issues. Although both fought the principles of social Darwinism and competitive individualism, they do not agree upon the relationships among natural and social sciences. Hofstadter thought that "Man's task is not to imitate the laws of nature but to observe them, appropriate them, direct them" (Hofstadter 1944, 58). Hofstadter was a determined fighter against the

translation of biology to human life through his work *Social Darwinism in American Thought, 1860–1915*, published in 1944, but in his task he ended with an unreasonable position. "what Hofstadter condemned as biological determinism, he proposed to substitute the opposite extreme, cultural determinism, the idea that biology has nothing to do with human action" (Leonard 2009, 39).

Kropotkin wrote *Mutual Aid* to oppose an emerging discourse and helped to cut the grass below the feet of an evolving doctrine, while Hofstadter reanimated the concept, although not the ideology. Neither Herbert Spencer nor William Graham Sumner used the term social Darwinism in all their writings —they even rarely cite Darwin—(Leonard 2009), and this is how Ruse (1980) deems Hofstadter meant social Spencerism instead of social Darwinism. Leonard (2009, 40) believes Herbert Spencer would himself have rejected the label Darwinist, "in part because his own theory of evolution differed from and was published before Darwin's" in 1852.

Leonard (2009, 47) maintains that some scholars consider: "Not only is the Darwin of the *Descent of Man* a social Darwinist, but so too is the Darwin of *The Origin of Species*, which contains no references to homo sapiens." Nevertheless this is not the case for Kropotkin. But they might agree that "it was classical political economy that influenced the theorists of organic evolution rather than the other way around" (Leonard, 2009, 48).

According to Hawley (1999) cooperation can be understood as a form of competition. She contends that—in the end—cooperation works in two ways: "individuals can work together to gain resources otherwise unattainable … or individuals can coordinate their efforts to gain access to resources which in the end are distributed inequitably" (Hawley 1999, 106). This cooperation-as-competition approach argues that a surficial cooperative and prosocial structure is a layer placed on top of the layer of selfish goals (Hawley 1999). And these without doubt emerge. Hawley judges: "Social dominance inevitably results when individuals are unequal in their ability or motivation to acquire and control resources" (Hawley 1999, 122).

Kropotkin adopts a teleological stance when he sees progress, through cooperation, in evolution, for he understands

unsocial species do not survive. Unexpectedly he could become Spencerian, and ultimately Lamarckian, opposing one of the three basic principles of Darwinism, random variation:

> ...the dominating influence of the mutual-aid factor as an element of progress.
>
> The mutual protection which is obtained in this case, the possibility of attaining old age and of accumulating experience, the higher intellectual development, and the further growth of sociable habits, secure the maintenance of the species, its extension, and its further progressive evolution. The unsociable species, on the contrary, are doomed to decay.
>
> ...for the success of the struggle for life, and especially for the progressive evolution of the species, is far more important than the law of mutual contest. (Kropotkin 1902, n.p.)

In modern times, the conception of cooperation does not seem to emphasize the influence on species success, as Kropotkin invoked, but its behavioral nature. It comprises both the social interaction and the outcome in terms of benefits and eventual costs (van Schaik and Kappeler 2006). Cooperation is not constrained to intraspecific processes but it is also interspecific (van Schaik and Kappeler 2006), improving the opportunities for the survival of the interacting species. Van Schaik and Kappeler (2006, 5) prefer a broader and more practical definition which excludes altruism, because it would be difficult to estimate whether an act is costly for the actor, and because "it is particularly difficult to explain the existence of behaviors that benefit others at the expense of the ego". Van Schaik and Kappeler (2006) think the examples provided by Kropotkin correspond in broad terms to mutualism, a kind of cooperation in which acts are beneficial for both actor and recipient, and particularly to by-product mutualism.

Kropotkin did not take into consideration other dimensions involved, such as the changes of strategy adopted by individuals over their life span (Hawley 1999), such as the varying levels of cooperativism. But, above all, Kropotkin did not recognize the various threats to cooperation, particularly the various forms of exploitation, in terms of "the vulnerability of the cooperator to being exploited by selfish partners" (van Schaik and Kappeler 2006, 4). Free riders, lack of timely reciprocity, and risk-avoidance in mutualism expose some social individuals to

high risk and are key limiting factors for the extension of cooperation. Its translation to human society not only increases the complexity of the search for explanation but also the adoption of this principle as a basis for governance.

The entire work of Kropotkin has a strong ethical focus driven by his political commitment with anarchism, which culminated in the text *Ethics: Origin and Development* (1924), and he judged cooperation was the basis for his ethics:

> In the practice of mutual aid, which we can retrace to the earliest beginnings of evolution, we thus find the positive and undoubted origin of our ethical conceptions; and we can affirm that in the ethical progress of man, mutual support not mutual struggle has had the leading part.
>
> That mutual aid is the real foundation of our ethical conceptions seems evident enough.
>
> In the practice of mutual aid, which we can retrace to the earliest beginnings of evolution, we thus find the positive and undoubted origin of our ethical conceptions; and we can affirm that in the ethical progress of man, mutual support—not mutual struggle—has had the leading part.

Despite his origins as a naturalist, Kropotkin rapidly turned into a social thinker who identified cooperation as a basis for social change. And this led him to be an evolutionist more than a revolutionist, despite the title of his memories (*Memories of a Revolutionist*, 1899), for he does not see sudden change in nature a factor of development. While he regrets Darwin did not propose—nor elaborate—the concept of cooperation, Kropotkin himself did not sufficiently elaborate the notion and laid major emphasis on criticizing the pretended predominance of competition. Notwithstanding Kropotkin's major contribution consists in the resolute association of the concept of mutual aid—or, in contemporary terms, cooperation—to evolutionary theory, and its application to the explanation of social processes, and to the elaboration of new forms of political action, particularly through public participation.

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