

OPINION

Global Darwin: Contempt for competition

Darwin's idea of the 'struggle for existence' struck a chord with his fellow countrymen. But Russians rejected the alien metaphor, says **Daniel Todes**, in the second of four weekly pieces on reactions to evolutionary theory.

In *On the Origin of Species*, Charles Darwin acknowledged his intellectual debt to the Reverend Thomas Robert Malthus. That debt had radically different consequences for his British and Russian readers.



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In *An Essay on the Principle of Population, as it Affects the Future Improvement of Society* (1798), Malthus argued against believers in social progress by citing an inexorable natural law: population tends to increase geometrically and food supply only arithmetically. These imbalanced progressions lead to a "struggle for existence" in which the winners prospered and the losers suffered privation and premature death. Nature itself decreed that human misery was inevitable.

By Darwin's day, Malthus's theory had entered the mainstream of British thought. Pondering possible mechanisms of evolution in 1838, the 29-year-old Darwin picked up Malthus's essay. Never a full-throated Malthusian in his political attitudes, he nevertheless adapted Malthus's idea to his science. "As more individuals are produced than can possibly survive," he explained in *On the Origin of Species* (1859), "there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life. It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms."

Darwin recognized that he was using the term "struggle for existence in a large and metaphorical sense" to encompass a variety of natural relations that one wouldn't necessarily conceive of as a battle: not just two dogs fighting over a scrap of food, but also a plant seeking moisture in the desert, or the dependence of one being on another.

For Darwin and other leading British evolutionists, this appealed to common sense. Living on a crowded island with a capitalist economy and highly individualist culture, struggle for existence did not seem a metaphor at all, but, rather, a simple and eloquent description of nature and society.

Russians, however, lived in a very different land. Their own cultural values and experiences

would lead them to reject Darwin's Malthusian metaphor. This in turn affected a wide range of research — from studies of the mutual aid among migrating fish to a Nobel prizewinning theory of inflammation and immunity — and echoed well into

the twentieth century, perhaps even playing a part in the enthronement of Lysenkoism. This Russian response provides a striking example of the way in which metaphors — and the experiences and cultural traditions that they capture — shape scientific thought.

The experiences of leading Russian naturalists were in many ways opposite to those of Darwin and his fellow proposer of evolution by natural selection, Alfred Russel Wallace. The two men shared seminal field experiences in densely populated tropical environments. The contest between organisms seemed obvious there. Most Russian naturalists, by contrast, investigated a vast under-populated continental plain. For them, nature was not an "entangled bank" — the image Darwin took from the Brazilian jungle. It was a largely empty Siberian expanse in which overpopulation was rare and only the struggle of organisms against a harsh environment was dramatic.

Cultural divide

Russia's economy, political structure and culture also contrasted sharply with those in the United Kingdom. Capitalism was only weakly developed and political supporters of the two most important classes, rich landlords and peasants, spoke the language of communalism — stressing not individual initiative and struggle, but the importance of cooperation within social groups and the virtues of social harmony. Russian political commentators of the left, right and centre reviled Malthus as an apologist for predatory capitalism and soulless individualism.

The cultural gulf between the two lands was captured by demographer and biologist Nikolai Danilevskii's summary of the British character in his book *Russia and Europe* (1869). The typical Englishman, he wrote, "accepts [struggle] with all its consequences, demands it as his right, tolerates no limits upon it". In his two volumes on Darwinism (1885, 1889), he catalogued

the lengths to which the English went to indulge their passion for individualistic conflict. They boxed one-on-one (not in groups, as Russians liked to spar), founded debating societies for the "struggle of opinions", and even established mountain-climbing clubs, not for scholarly purposes, "but solely to allow oneself the satisfaction of overcoming difficulties and dangers ... in competition with others".

Small wonder, then, that few Russians shared Darwin and Wallace's respect for Malthus, and that many saw the struggle for existence as an infusion of the British enthusiasm for individualistic competition into natural science. Darwin's theory, as Danilevskii put it, was "a purely English doctrine".

Most Russian naturalists, many of whom were evolutionists before 1859, shared that view. Yet they also admired Darwin and didn't think his association with Malthus justified complete rejection of his theory. Their common response was to break down Darwin's Malthusian metaphor into its component parts, to explore their relationship and relative importance in nature and to conclude that he had greatly exaggerated the role of the two parts most closely associated with Malthus: overpopulation as the generator of conflict, and intraspecific competition as its result.

This common response defined a general direction, but individual scientists took different paths. Russia's leading botanist, Andrei Beketov, concluded that intraspecific struggle was a minor note within the general "harmony of nature". Devaluing natural selection, he reaffirmed his long-standing view that evolution resulted chiefly from the direct action of the environment on organisms. Botanical geographer Sergei Korzhinskii was led to his 'theory of heterogenesis' — the idea that mutations create large, step changes that could yield new species in a single move. This theory, he emphasized, offered the great advantage of denying any creative evolutionary role to the struggle for existence, which he thought merely pruned the rich tree of nature. Zoologist Ilya Mechnikov emphasized interspecific struggle. This proved crucial to his development of the 'phagocytic theory of inflammation and immunity', for which he received a share of a Nobel prize in 1908.

The critique of Darwin's metaphor led many Russian naturalists to the theory of mutual aid, which emphasized the importance of

"In the Siberian expanse, only the struggle of organisms against a harsh environment was dramatic."



ILLUSTRATION BY G. LAM

cooperation. Darwin too had called attention to such cooperation, but the theory of mutual aid went further. It held that the central aspect of the struggle for existence is an organism's struggle with abiotic conditions, that organisms join forces in this struggle, that such mutual aid is favoured by natural selection, and that cooperation so vitiated intraspecific competition as to render it unimportant in the origin of new species. Often voiced in the 1860s and 1870s by lay intellectuals and scientists of every political stripe, this view was first systematized by St Petersburg University's ichthyologist Karl Kessler, whose oral presentation *On the Law of Mutual Aid* (1879) transformed this widespread sentiment into a staple of Russian evolutionary thought.

Anarchistic association

Westerners, however, soon came to associate this view with one of Kessler's admirers, the exiled anarchist prince Peter Kropotkin. In a mirror image of the Russian response to Darwin's invocation of Malthus, western Europeans often dismissed the theory of mutual aid as a simplistic expression of Kropotkin's anarchism.

Yet Kropotkin's critique of Darwin's Malthusianism had originated in 1862–67, long before he became a committed anarchist. He had travelled through Siberia with a series of military and commercial expeditions, traversing more than 80,000 kilometres in the same role of gentleman-observer that had taken Darwin, decades earlier, to the tropics. Already an evolutionist, Kropotkin read *Origin* in the Siberian wilderness, and found the emphasis on overpopulation and intraspecific competition unconvincing. As an exile in England years later,

an appalled Kropotkin read Huxley's "atrocious article" on *The Struggle for Existence in Human Society* (1888). His responses, brought together in *Mutual Aid: A Factor of Evolution* (1902), reflected the basic logic of the Russian national style, just as Huxley's essay reflected that of his own homeland.

The struggle for existence remained a preoccupation for Russian evolutionists well into the 1920s and 1930s. Among them was Georgii Gause, who developed the 'competitive exclusion principle' (which held that no two species could share the same ecological niche in a stable environment). His laboratory experiments and mathematical analyses confirmed the importance of intraspecific competition, contrary to the traditional Russian consensus.

In 1948, Joseph Stalin himself encouraged Trofim Lysenko to add an extensive critique of Darwin's "Malthusian error" to Lysenko's landmark speech about his own 'creative' Darwinism. As a young revolutionary at the turn of the century, Stalin had read Darwin and taken an interest in evolutionary theory. Lysenko's doctrine, which was forcibly imposed on Soviet biology from 1948 to 1964 by Stalin and his minions, endorsed the Lamarckian inheritance of acquired characteristics, rejected the gene as a material unit of heredity, and denied the evolutionary role of overpopulation and intraspecific competition. The long-standing Russian critique of Darwin's Malthusianism did not cause Lysenkoism, but it seems possible that, by influencing Stalin, it contributed to this tragedy.

A different metaphor caused Darwin problems in his native land. Wallace remarked, in his article *Mr. Darwin's Metaphors Liable to*

Misconception (1868), that the Malthusian progressions and struggle for existence were self-evident "facts". Yet because natural selection seemed to personify a perceptive and forward-thinking selector, or god, he urged Darwin to replace the term with "survival of the fittest".

Darwin, however, had brushed him off. "Every one knows what is meant and is implied by such metaphorical expressions," he had demurred. "And they are almost necessary for brevity."

On this point Darwin was surely mistaken. Metaphors are brief, but they are fruitful and powerful precisely because they are not clear. They propose open-ended associations that acquire specific meaning only in the mind of individuals who consider for themselves, based on their experiences, how precisely existence is a 'struggle', an animal is a 'machine' or DNA a 'code'. Those associations and meanings often have a cultural component.

Researchers bring their life experiences and culture with them into the field and laboratory, and in the course of their investigations actively originate, interpret, develop and reject metaphorical pathways. As is shown by the reception of Darwin's theory in Russia, the deployment and criticism of metaphors are part of the ineffably human process by which scientists mobilize their experiences and values to explore the infinite complexity of nature. ■

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