Lysenkoism
The Tragedy of Government-Enforced Darwinism
The Effect of Darwin on Soviet Communism

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Abstract

The story of the Russian scientist Lysenko is a tragic example of what can happen when the science establishment and the government uncritically support Darwinism and oppose competing theories of origins. The enforcement of Darwin's ideology by government and organized science had disastrous effects on Russian agriculture, which led to major repercussions to the Russian economy, contributing to the Soviet famines that killed multimillions of people. Only when the tragedy became all too evident did the public and academia rise up to resist the Lysenko-Darwin orthodoxy and work to correct the harm that it caused in the Soviet Union. This incident is an important lesson for current governments that support neo-Darwinism and persecute Darwin dissenters.

Introduction

Karl Marx had a keen interest in Darwinism, as illustrated by the fact that his reading in natural science centered chiefly on material "dealing with change or development, such as biological evolution" (Joravsky, 1961, pp. 7–8). His interest was shared by many of his compatriots because of what they saw as a "parallel between Darwin's theory and political economy" and because Darwin's work was the foundation for the view of human history that was the primary basis of communist theory (Joravsky, 1961, p. 12). Both Marx and Engels enthusiastically embraced Darwinism because it dealt a "mortal blow" not only to theology, but also to all similar teleology in natural science (Joravsky, 1970, p. 230). Many socialists, though, accepted evolution but opposed natural selection, especially when applied to humans (Weikart, 1999).

The first known Russian intellectual to attempt to blend Marxism and Darwinism was Peter Tkachev (Rogers, 1963). Soon after, Tkachev and other Russian intellectuals also attempted to achieve a seamless synthesis of the two major ideologies, Marxism and Darwinism, that were the foundational concepts in the Soviet Union (Rogers, 1963). In addition, both Lenin and Stalin were so heavily influenced by Darwinism that they also were forced to blend it with Marxism. The Soviet government accepted Darwinism early in its history to the degree that the

> theory of biological evolution, with its relevance for the historical origin of man and its reputation for opposition to religious myths, became

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> a central part of the official Soviet worldview. In 1931 the first chair (kafedra) of "dialectics of nature and evolutionary theory" was established at the University of Leningrad with Isaak I. Prezent as head (Roll-Hansen, 2005, pp. 86–87).

Prezent also became an active and influential member of the Communist party. He worked diligently for much of his life to implement the Communist party's political program, which emphasized creating a new science supporting the "class struggle" ideology and stressing the influence of environment on the development of life. For this reason, the 'inheritance of acquired characteristics' theory was a critical tenet for Marxism. Prezent was a committed Darwinist and even organized a museum at Leningrad University to honor his hero Charles Darwin (Medvedev, 1969, p. 259). Prezent's ideology was Darwinistic to the core, including Darwin's acceptance of pangenesis and Lamarckian biology. Specifically, "Darwin held that environmental changes, acting either on the reproductive organs or on the body, were necessary to generate variation," and Darwin "increasingly emphasized somatically-mediated variations at the expense of germinally-mediated variations" as he developed his evolution theory (Winther, 2000, pp. 425, 440). Mendelism, which concluded that genetic traits were "inherited rather than acquired, was contrary to the party's political program" (Roll-Hansen, 2005, p. 87).

Prezent opposed scientists who argued that many mental abilities were inherited and stressed that Soviet science should always be practical and supportive of the proletariat, a statement that was interpreted to mean the environment was critically important, as Lamarckian biology stressed. Implied in Lamarckism was the belief that people could become more perfect if they put forth the effort, an idea that fit into the chief article of faith in the Soviet socialists' paradise ideal of the innate perfectibility of humans (Marshall, 2001).

Darwinism was enthusiastically accepted in Russia to even a greater degree than in Western Europe (Rogers, 1973, p. 484). One reason Darwinism was so rapidly accepted in Russian culture was because, in contrast to Western Europe, where

> Darwin's theory encountered firmly established religious traditions among many of the educated elite [in Russia the appearance of Darwinism] … coincided with the rise of a secular intelligentsia that venerated the natural sciences. The young radical thinkers of the 1860's looked to the natural sciences for the ultimate solution of all problems. They enthusiastically received Darwin's theory of evolution as the corollary in biology of Newton's laws in physics. Biology had been the last refuge in the natural sciences of teleological and religious interpretations, and the young radicals saw in Darwin's theory a splendid materialistic interpretation which explained the evolution of all organic life (Rogers, 1963, p. 457).

Darwinism profoundly influenced not only science but also all areas of thought in Russia, especially after the Russian Revolution (Vucinich, 1988).

Trofim D. Lysenko

Trofim D. Lysenko (1898–1976) was a Ukrainian orthodox Darwinist agronomist who achieved a high position in both the Soviet scientific establishment and the Soviet government. Lysenko "for nearly thirty years exercised a virtual monopoly over Soviet agricultural and biological sciences" (Krementsov, 2006, p. 386). Furthermore, he is recognized as

> undoubtedly one of the most notorious scientists of the twentieth century. Already during his lifetime, his name—like those of Charles Darwin, Karl Marx, and Gregor Mendel—was transformed into a catchall label. "Lysenkoism" came to denote ... the political suppression of Lysenko's scientific opponents and the direct endorsement of his doctrine by political authorities (Krementsov, 2006, p. 386).

The fact that "Darwin's theory of evolution was enthusiastically accepted in the 1860s by nearly all the Russian intelligentsia" set the stage for the acceptance of Lysenko's pure Darwinism, uncontaminated by the findings of Gregor Mendel (1822–1884) (Rogers, 1963, p. 459). Lysenko concluded that Mendelism or "Western genetics" was "unscientific" because it was "metaphysical," partly because Gregor Mendel was an Austrian Catholic Monk (Gajewski, 1990, p. 425). Lysenkoism was "the only truly scientific and materialistic theory of heredity constructed on the basis of dialectical materialism" (Gajewski, 1990, p. 425).

Lysenko was also "very close" to the leading Soviet Darwinist, A.I. Oparin-Lysenko's *docha* (country home) on the outskirts of Moscow adjoined that of Oparin (Yockey, 2005, p. 153). Lysenko rose to prominence in the 1930s and had a major influence on Soviet agriculture in both the 1930s and 1940s and for decades thereafter (Hossfeld and Olsson, 2002). Lysenko was even supported by certain prominent Western biologists, such as "England's most admired geneticist, J. B. S. Haldane" (Gardner, 1992, p. 244). Lysenko's formal fall from grace did not occur until Khruschev's ousting in 1964 (Krementsov, 2006).

As documented by historians, the result of Lysenkoism was a disaster for both Soviet food production and the Soviet people (Soyfer, 1994; Gajewski, 1990). The disaster resulted from Lysenko's acceptance of Darwinism, as taught by Darwin toward the end of his life—including natural selection, Lamarckism, the rejection of Mendelian genetics, and the rejection of the mutation theory of

Thomas Hunt Morgan (now called the "modern synthesis" or neo-Darwinism). Although Darwin accepted Lamarckism as one possible explanation for variation in the first edition of *The Origin*, he increasingly accepted Lamarckism, as is evident in later editions of *The Origin*. One reason he accepted Lamarckism is because Darwin believed that "Thomson's views of the recent age of the world have been for some time one of my sorest troubles" and he needed a mechanism that allowed for rapid evolution (Browne, 2002, p. 315). As Browne noted,

> The 100 million years that Thomson allowed was not nearly long enough for the exceedingly slow rates of change Darwin envisaged in nature. The fifth edition of the *Origin* bore witness to his discomfort. Rattled, he tried various ways to speed up evolution. He was aware that he was becoming more environmentalist, more Lamarckian … the age of the earth was the single most intractable point leveled against his theory during his lifetime (Browne, 2002, p. 315).

Lysenkoism became the "official ideological doctrine in the Soviet Union," approved by Stalin. It further became a "canonical text" that rejected "neo-Darwinism" as well as Mendelism. It also rejected the mutation research done by Thomas Hunt Morgan (Morganism) and August Weisman's work on mice, which disproved Lamarckism. This "official ideological doctrine" stressed that Darwinism, as taught by Darwin himself, contradicted Western philosophy. Lysenkoists taught that neo-Darwinian biologists for this reason did everything within their power to overthrow the old Darwinism.

> In the post-Darwinian period "the overwhelming majority of biologists"—far from further developing Darwin's teaching—did all they could to debase Darwinism, to smother its scientific foundation. The most glaring manifestation of such debasement of Darwinism is to be found in the teachings of Weismann, Mendel, and Morgan, the founders of modern ... "reactionary" genetics (report quoted in Rossianov, 1993, p. 737).

Another reason for the Soviet government's embrace of Lysenko was that he accepted the macromutation views of DeVries, which taught that "heritable changes could occur by big, sudden leaps" (Rice, 2007, p. 252). The Soviets believed this view mirrored the goal of the Russian Revolution, which they believed propelled them in a single year from the Middle Ages into the modern world.

Prezent, who became Lysenko's chief theorist in 1934, wrote that "creatively developed Darwinism," or what was often called the "new biology," must play a critical role in both "the struggle against metaphysics in questions of life" and in "reconstruction of biological science" (quoted in Medvedev, 1969, p. 46). Because Lysenkoism was in many ways an anti-creation movement, or at least an anti-theism movement—as was Marxism—the two ideologies fit together well. A major claim of Lysenko was that "one species of plant can undergo transformation into another" simply by altering the environment (Gajewski, 1990, p. 427).

Once Lysenko achieved power, his supporters, including many leading scientists and the Soviet government, ruthlessly suppressed his critics. Many lost their jobs, some suffered imprisonment, and a few, such as geneticists Israil Agol and Solomon Levit, microbiologist Georgy Nadson, and Russia's leading Mendelian geneticist Nikolai A. Vavilov, died in prison or were even executed, often on false charges (e.g. Soyfer, 1994, p. 156; Medvedev, 1969, p. 258). Vavilov was sentenced to death for, among other things, belonging to a political rightist organization (Gould, 1983). Among other things, Vavilov was "guilty" of interpreting his data "in a manner uncongenial with strictly Darwinian or Larmarkian views" (Gould, 1983, p. 137). Little tolerance existed for deviating from strict Darwinian interpretations. In fact, Vavilov's views were not really anti-Darwinian, but non-Darwinian, in that he accepted evolution, but not by means of the mechanism that Darwin proposed.

So important was the Lysenko affair that it has "commanded the attention of biologists, historians, sociologists, philosophers, and Sovietologists" for decades after the movement fell (Krementsov, 2006, p. 386). The effect was so widespread that the term "Lysenkoism" has come to mean scientific oppression of minority science by the dominant science with the aid of the government.

Although Darwinism was essential to the Soviet worldview from the very beginning (Karl Marx, V.I. Lenin, Joseph Stalin, and many leading Soviet leaders were all committed Darwinists), Lamarckism-style Darwinism was never dominant in the Soviet Union until Lysenko achieved formal government support for orthodox Darwinism. Although repeating Lysenko's experiments under more stringent conditions shed major doubts on his results, Lysenko and his followers believed so strongly in his ideology that they stubbornly refused to admit that they could be wrong (Gould, 1983). Some studies were even falsified or were based on faulty methodology (e.g. Gajewski, 1990, p. 427; Putrament, 1990, p. 443). Julian Huxley (1949, p.10) concluded that Lysenko genuinely believed that he had scientifically proven the inheritance-of-acquired-traits theory and most of the Soviet scientific community unthinkingly went along with the program.

Darwin's Support for Lamarckism

Many theories of evolution existed at the turn of the last century in Russia,

as well as in Europe and the Americas. Darwin openly advocated Lamarckism until he died. Lamarck supported, as did Darwin, the theory of the inheritance of acquired characteristics. This theory essentially taught that characteristics acquired during an organism's lifetime, such as strength, could be passed on to its progeny. The classic example is that giraffes must stretch their necks in order to reach the higher levels of trees, and this stretching modifies the animal's gametes as a result of the action of particles that Darwin called *gemmules*.

The modified gemmules were given off by various body structures and traveled to the eggs or the sperm, allowing changes that occurred in the animal's body to be passed on to its offspring (Bergman, 2006). Thus, those giraffe ancestors that stretched their necks to reach leaves would have offspring that had longer necks. This process eventually caused giraffes to acquire the long necks and legs as seen today.

Although Lysenko did publish a set of lectures about the effects of temperature on plant development, he had little formal training in biology. Lysenko was not a Marxist, and he never joined the Communist party; but he was introduced to evolutionary theory early in life, evidently by the society of Marxist biologists, and eagerly embraced Darwinism along with the Lamarckian ideas that Darwin espoused (Wells, 2006, p. 185). Lysenko attracted the attention of agricultural scientists partially because he was an eloquent and articulate spokesman for classical Darwinism. No doubt many of the Marxist biologists who had accepted Lamarckian ideas were a major source of support to Lysenko.

Widespread famine was occurring in the Soviet Union during that time, and Stalin's government was forced to respond to the problem. One response was to encourage Soviet scientists to find with a solution. Lysenko, probably more of an opportunist than an ideologue, jumped at the opportunity to apply his Larmarkian ideas to the agriculture sector. After Lysenko had the full support of the government, persecution of dissidents soon followed.

Among the many supporters of Lysenko was the Soviet minister of agriculture, Jakov Jakovlev, whom argued that Mendelian genetics is incompatible with true Darwinism. Jakov demonized Mendelians as the "powers of darkness" and praised Lysenko for marching "under the banner of reconstruction of biological science on the basis of Darwinism raised to the level of Marxism" (Roll-Hansen, 2005, pp. 218–220). The level of Lysenko's support is illustrated by a 1948 address he gave to the Lenin Academy of Agricultural Science. In his talk, he reported that the central committee approved his program, and the response was described as "stormy applause" (Gould, 1983, p. 135).

When Mendelian biologists criticized Lysenko, his defense was not always rational or supported by scientific arguments. Lysenko often evaded their arguments or tried to claim that Mendelian genetics was wrong because it "was incompatible with true Darwinism" (Roll-Hansen, 2005, p. 219). In addition, in the Soviet Union "loyalty to 'Darwinism' had become a touchstone for scientific truth in genetics" (Roll-Hansen, 2005, p, 219). As Wells noted,

> science in the Soviet Union was government-supported on a scale unprecedented in history. Driven by a desire to surpass the West, the Soviet Union devoted a larger share of its budget to science than did any other industrialized nation. Unfortunately, unprecedented government support also meant unprecedented government entanglement (Wells, 2006, p. 184).

Herein lies the problem: no geneticist "dared openly to reject Darwinism" in the Soviet Union (Roll-Hansen, 2005, p. 219). The penalty could be, and sometimes was, death or long terms of imprisonment in Siberia. At the least, biologists who refused to conform to the requirement that they teach Lysenkoism as fact had their teaching duties taken away (Gajewaki, 1990). The textbooks were "full of Lysenkoism," which professors were required to teach, and Mendelian genetics was disparaged. A problem is that many well-known geneticists, some even outside of communist countries, were sympathetic to Marxism, including J. B. S. Haldane and Herman J. Muller. Unfortunately, the Marxist sympathies of some biologists may have implied support for aspects of Lysenkoism that they did not support (Berg, 1990).

As the scientific evidence against Lamarckism accumulated, many scientists eventually realized that the theory was false and had to be rejected. When Mendel's work on garden peas was rediscovered, more and more scientists welded Mendelian genetics to Darwinism. Mendel's work, first published in 1866, was almost totally ignored until after 1900, and even at late as the 1930s some Western biologists remained skeptical of Mendel's views. Reasons for their skepticism include the fact that genes were unobserved abstractions until the middle 1900s and the fact that well-known exceptions to Mendel's laws existed.

Lysenkoism adversely affected not only the USSR but other nations as well, especially the Communist Bloc countries such as Poland and Czechoslovakia (Gajewaki, 1990; Orel, 1992). The introduction of Lysenkoism into these nations had disastrous effects. Utilization of techniques that interfered with efficient crop production not only negatively affected the Polish economy and agriculture production, but also the "national economy" in several Eastern Bloc countries (Gershenson, 1990, p. 447).

Lysenko's Contributions to Science

Lysenko did not rise to prominence without some valid scientific support

for his work. Liu (2004) argued that he did do some good scientific research and actually made some contributions to several fields of biology. Lysenko had to have some credibility in order to convert so many prominent scientists to his position. Examples Liu provides include research on the so-called cold treatment of plants that induces or accelerates flowering, a process called vernalization. Usually the "cold treatment" involved chilling moistened seeds for a few weeks. Roll-Hansen noted that the "continued use of this term is an indication of the international scientific impact that Lysenko's work had" (2005, p. 113).

It was this technique that brought the ordinary farmer Lysenko to the attention of the Soviet authorities. Lysenko had collected much data on the effect of time and temperature variables on the vernalization process (Roll-Hansen, 2005, p. 116). Rice (2007) noted that if "Lysenko had stopped here, he might today be revered as the man who helped save Soviet agriculture, but he went further," wrongly claiming that the chilling process actually changed the seeds in ways that were heritable (p. 252).

Contemporary Analogy

The Soviet Union has provided history with "the major example of how a science can be crippled by political dogma," namely by the "abandonment of modern genetics for the crackpot Lamarckian views of plant-breeder Trofin D. Lysenko" (Gardner, 1992, p. 244). The Lysenko tragedy was primarily a result of government interference in science, imposing the dogmatism of certain Darwinist ideologues, especially on scientists. Otherwise, Mendelists likely would have prevailed—as it did in most of the rest of the world—because the proponents of Mendelism had the scientific evidence supporting their basic theory. The history of the Lysenko affair provides an important contemporary lesson when Darwinian fundamentalism is dogmatically supported by many governments, including the United States. The fact is, throughout his entire career, Lysenko was a "Darwinist because most of his ideas are consistent with Darwin's ideas" (Liu, 2004 p. 490). Gershenson (1990) wrote that after the basic theory of Lysenko was shown to be completely erroneous, it was necessary to learn the lesson of

> how important it is, always and everywhere, to stand for scientific truth, and to what fatal results the violation of ethical standards in science may lead. Such violations were typical of Lysenko's supporters, who used every means in their power to eliminate their scientific opponents in order to establish their own careers and to reach their personal goals. It is necessary to understand clearly how dangerous ignorance can be when it is in power. Beyond taking notice of all this, it is necessary to speak out about it, because even now Lysenkoism continues to exist, and no one should pretend that now all is well. (p. 447)

The same conclusion is true of the crusade against Darwin skeptics today. What happened in the Soviet Union with Lysenkoism is now happening in other countries as a result of state enforcement of neo-Darwinism. Under Lysenkoism "expressing one's personal views was regarded as a declaration of hostility toward ... science" (Gajewski, 1990, p. 427). Today, under the control of Darwin fundamentalists, the same charges leveled against Lysenko's critics are now leveled against creationists. As Gajewski (1990) observed, after he returned from Sweden in 1948 he

> still continued for some time to lecture on genetics in Warsaw University.... Soon, however, the Lysenkoist version of genetics became official, and the Council of the Faculty of Biology asked me to abandon teaching the old, erroneous genetics and to introduce in its place the correct, new one. My answer was that there is only one genetics—that which is based on well-established evidence. Then a compromise was offered: I should teach both the "new" and the "old" genetics. I retorted that this could not be done, inasmuch as they were contradictory. I was then temporarily forbidden to teach genetics at all. Professor Petrusewicz wanted to convert me, so took me for an excursion to the Soviet Union. As a special privilege, he organized for me an official visit to Lysenko in his office at the Institute of Agronomy in Moscow, so that I could learn at the very source of enlightenment and ... change my views. (p. 426)

Summary

Lysenko's rapid rise to power and his plan to save Russia from famine by relying on the refuted theory of Lamarckianism is an important event in history. The suppression of dissidents and Lysenko's ultimate failure and fall from grace (upon the eventual realization that many of his ideas were wrong) is the heart of the problem that results when Darwin ideologues attempt to muzzle those who disagree. The cost is harm to both science and society. The lesson of the Lysenko tragedy, that government-enforced orthodoxy in science can lead to blocking of scientific inquiry and progress, strongly parallels current events of government enforcement of orthodox neo-Darwinism resulting in suppression of dissidents (Joravsky, 1961, 1970). Looking back, scientists today have judged him as ignorant, yet he had the backing of many, if not most, scientists, as well as the governments of several nations (Putrament, 1990, p. 435).

Although dissidents today are not sent to gulags, the lesson of Lysenko applies to the contemporary suppression of those scientists and others who have concluded that neo-Darwinism does not fully explain the natural world. They are

labeled ignorant, but their conclusions about abiogenesis, vestigial organs, junk DNA, ontogeny recapitulates phylogeny, and other areas have largely all been proven correct. Furthermore, Lamarckism is still inferred in science, such as when an evolutionist implies that a life-form developed a structure because it needed it in order to exploit its environment.

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