

LYSENKOISM

Michael D. Gordin – Princeton University

Suggested Citation: Michael D. Gordin, "Lysenkoism," *Encyclopedia of the History of Science* (February 2022) doi: 10.34758/d5bq-k368

There is no uncontroversial definition of "Lysenkoism," which is often used to refer to two different phenomena. The first, localized, meaning encompasses the ideas expressed by the Soviet agronomist Trofim Denisovich Lysenko (1898-1976), and more broadly to the political phenomenon of his rise to dominance in Soviet biology from 1948 to 1965 — sometimes also referred to as "the Lysenko affair," giving a complex episode the sheen of a paperback thriller. The second usage, more common outside of the former Soviet Union, appropriates one interpretation of Lysenko's career to decry political intervention in and distortion of scientific knowledge. These two Lysenkoisms are related — there is no moralistic tale of politicization without the events associated with the person — but the connection between them has often been tenuous and was always manipulated for various ideological ends both in the Soviet Union and the West.

Even the first definition, tied to Lysenko the individual, is ahistorical. To be sure, Trofim Lysenko did exist, and he was indeed elevated in 1948 to a position of overweening (though not total) dominance in Soviet biology. This led to a 17-year official proscription in the Soviet Union of the pursuit of what was known as "classical genetics," derived from the principles first laid out by Augustinian friar Gregor Mendel (1822-1884) in 1856-1863 in Brno, Moravia (now in the Czech Republic), and widely introduced into research on heredity in 1900. The most common contemporary descriptor for Lysenko's ideas in the 1930s and 1940s was "Michurinism," named after the Russian plant breeder Ivan Vladimirovich Michurin (1855-1935). In the 1950s, Lysenko took to labeling his biological program "agrobiology," to emphasize the connections between scientific research and practical agricultural applications. In certain contexts, he called it "creative Soviet Darwinism." Vagueness and inconsistency in terminology occurs even in specialist histories of Soviet biology, but is especially rife in those that concentrate on events outside the Soviet Union, and care is rarely taken to specify whether the term refers to a set of biological doctrines or a political intervention.

The term "Lysenkoism" was generally not used in the USSR itself until the late 1980s, however, when Mikhail Gorbachev's policy of *glasnost* encouraged the publication of many histories, documents, and interviews concerning the abuses of the Stalin era, of which Lysenko's suzerainty was one. In those final years of the Soviet Union, one occasionally heard

the term "*Lysenkovshchina*," using the *-shchina* suffix used in Russian to designate a period of political repression associated with a specific individual (e.g., *Stalinshchina*).¹

The history of the second meaning of "Lysenkoism" — as an accusatory term for state-led, typically Communist or (more recently) left wing, manipulation of science for political ends — is more straightforward. It was first coined in the late 1940s in the United States and then spread widely across Western Europe, contemporaneous with the proscription of classical genetics, and it has maintained currency even as the linkage to mid-century genetics has faded almost entirely. It is always used as a term of abuse: nobody self-identifies as a "Lysenkoist" these days.

COMRADE LYSENKO

Trofim Lysenko was born into a peasant family on 29 September 1898 (17 September according to the Old Style Julian calendar then current in the Russian Empire) in the village of Karlovka (today Karlivka in Ukraine).² He learned to read and write only at age 13, and two years later he graduated from a second-tier agricultural school and enrolled in a lower academy for agronomy in Poltava. From 1917 to 1921 he attended a higher agronomical school in the Ukrainian city of Uman'. Lysenko was a student through a highly tumultuous period, beginning with World War I, through the two Russian Revolutions of 1917, and then into the protracted Civil War that was especially violent in Ukraine. Lysenko's loyalties were never divided: he attached himself to the victorious Bolsheviks, and they in turn granted him opportunities for education and advancement that would have been previously unthinkable for a provincial peasant boy.

¹ deJong-Lambert and Kremmentsov, "On Labels and Issues."

² Details of the early career are drawn from the Stalin-era biography, Voinov, *Akademik T. D. Lysenko* (1950). Information about Lysenko's education is often either omitted or passed by quickly in Anglophone accounts.



Figure 1: Trofim Lysenko (at left) speaking in 1935, with Stalin (back right) looking on. Source: Wikimedia Commons.

In 1922 he moved to Kiev for work and further study, completing training as an agronomist by 1925 at the Kiev Agricultural Institute, during which period he also worked on plant breeding experiments at an agricultural station. His first publications appeared in 1923, written in Russian. Unusual for both pre-Revolutionary scientists and the leadership of Soviet science, including in this period, Lysenko knew no foreign languages, and his engagement with developments in international science was entirely mediated by translation. In other circumstances his limited educational attainments might have inhibited his career, but in the 1920s the Soviet Union was looking to promote home-grown, previously underprivileged classes into the technical intelligentsia, even as Vladimir Lenin's regime tolerated the "former people" (*byvshie liudi*) as a necessary stopgap until "red experts" had been trained up.³ Lysenko's career path matched that trajectory precisely. In 1925 he was sent to a breeding station in the town of Giandzhe, in Azerbaijan, where he was assigned to work on legumes. On 7 August 1927 an article praising him appeared in *Pravda*, the official newspaper of the Communist Party. It was a prominent advertisement for the young Ukrainian, and helped launch his career onto a larger stage.

The following year, Lysenko published his first paper on vernalization (in Russian, *iarovizatsiia*), the practice of exposing seeds to cold and moisture in order to encourage better yields and greater resistance to inclement weather. Through such methods, he was

³ Bailes, *Technology and Society under Lenin and Stalin*.

able to induce seeds of winter wheat to be productive even when planted in the spring. His claimed results seemed promising, although his research was not conducted with proper controls or subjected to statistical analysis. Vernalization was not a new practice. These methods (e.g., rubbing seeds with ice) had been known since the nineteenth century among practical farmers, and had been the subject of careful study by plant physiologists for at least a decade before Lysenko came to them.⁴ For the Soviet leadership, however, novelty or originality was not the issue: Lysenko was the right man at the right time.

It was no accident that someone with Lysenko's background, promulgating a set of practices to increase grain yields that could be implemented by even the most uneducated peasant, would catch the attention of the Soviet propaganda apparatus. In the late 1920s, Joseph Stalin initiated the collectivization of Soviet agriculture, forcibly combining individual farms into larger collective ones (*kolkhozy*) and making peasants work them. Peasant resistance, unfortunate weather, the competing demands of the simultaneous crash industrialization program and an acceleration of grain requisitions by the state, as well as a deliberate policy of breaking nationalist resistance to Soviet power in Ukraine yielded catastrophic results. Millions died in the ensuing decade from starvation or police actions.⁵ Anything that could serve as good propaganda — such as promoting a former peasant who claimed to have a panacea to improve agricultural yields — was a welcome distraction from the tragedy in the countryside.

Lysenko transformed his collection of suggestive results and hypothetical practices into a more elaborate theory not of plant physiology, but of heredity and evolution: "Michurinism." In 1929, Lysenko was transferred to the All-Union Institute of Breeding and Genetics in Odessa, where he rose through the ranks to become its director in 1934. That same year, he met a philosopher of biology who was recently transferred to the Odessa institute, Isaak Izrailevich Prezent (1902-1969), and the two of them began to collaborate on this theoretical upgrade, with Prezent supplying the elements of the official Marxist philosophy of science, dialectical materialism.⁶ As the decade wore on, Lysenko assembled the hints across his past publications into an elaborate theory of nature. A fully developed version of the results can be seen in his plenary lecture at the August 1948 session of the All-Union Lenin Agricultural Academy (VASKhNIL), an event which was pivotal in what came to be called "Lysenkoism":

The Michurinian teaching flatly rejects the fundamental principle of Mendelism-Morganism that heredity is completely independent of the plants' or animals' conditions of life. The Michurinian teaching does not recognize the existence in that

⁴ Roll-Hansen, *The Lysenko Effect*, 28-32; Hudson and Richens, *The New Genetics in the Soviet Union* (1946).

⁵ Conquest, *The Harvest of Sorrow*, provides a good but dated introduction to these events. The scholarly literature on this subject has exploded since the dissolution of the Soviet Union, providing much more detail but confirming Conquest's general picture.

⁶ Joravsky, *The Lysenko Affair*, 91-92; Graham, *Science and Philosophy in the Soviet Union*, 209-16.

organism of a separate hereditary substance which is independent of the body. Changes in the heredity of an organism or in the heredity of any part of its body are the result of changes in the living body itself. And changes of the living body occur as the result of departure from the normal in the type of assimilation and dissimilation, of departure from the normal in the type of metabolism. Changes in organisms or in their separate organs or characters may not always, or not fully, be transmitted to the offspring, but changed germs of the newly generated organisms always occur only as the result of changes in the body of the parent organism, as the result of direct or indirect action of the conditions of life upon the development of the organism or its separate parts, among them the sexual or vegetative germs. Changes in heredity, acquisition of new characters and their augmentation and accumulation in successive generations are always determined by the organisms' conditions of life. Heredity changes and increases in complexity as the result of the accumulation of new characters and properties acquired by organisms in successive generations.⁷

This passage contains many of the hallmarks of Michurinist doctrine. First, and most obviously, is the casting of the precepts in the light of horticulturalist Ivan Michurin's teachings. Michurin was much lionized in the early Soviet Union as a gifted plant breeder who crossed geographically-distant varieties to produce useful variants of apple, cherry, and other plants. He was also, by 1935, conveniently dead, and therefore a suitable namesake for a new scientific movement, in contrast to "Mendelism," identified with a foreign, Catholic monk.⁸ (The supplementation of this epithet with "Morganism," after American geneticist Thomas Henry Morgan but also resonant with the vilified banker J. P. Morgan, and "Weismannism," after August Weismann's principle of inviolable germ lines but also damningly German in the tense 1930s, cemented the guilt-by-association.) Michurin as metonym also associated Lysenko's doctrines with a long tradition of Russian adaptationist thought extending before the Revolution.⁹ This emphasis on pliancy and flexibility took on a new salience in the Bolshevik era, and fit neatly into a broader cultural trope associated with the literature of Maxim Gorky and pedagogical theories of Anton Makarenko.¹⁰

The biological claims also resonated with various philosophical themes stressed by official "materialist" ideology. At first blush, one might imagine that classical genetics, with its particles of hereditary matter being passed from generation to generation, would be the more obviously materialist doctrine, and this claim was indeed made both before and after

⁷ Lysenko, *The Science of Biology Today*, 32-33.

⁸ Lysenko is quoted as calling genetics "the invention of a Catholic monk" in Gershenson, "Difficult Years in Soviet Genetics," 449; and raised (in rebuttal) in Huxley, *Heredity East and West*, 36.

⁹ Todes, *Darwin without Malthus*; Weiner, "The Roots of 'Michurinism.'"

¹⁰ Oushakine, "The Flexible and the Pliant." On the Promethean ambitions of the early Soviet era, see Stites, *Revolutionary Dreams*.

Lysenko's era of control.¹¹ But there were plenty of countervailing arguments. Lysenko objected to the "immortality" and immutability of genes as they were conceived of at the time — a description which was easy to caricature as "idealist" or "metaphysical" — and he instead cast heredity as a dialectical interchange of cellular matter and its environment. This was not only more materialist, but it also emphasized the flux and development which was central to dialectical reasoning.¹² In this manner, Lysenko (with Present's assistance) not only contended that he offered a series of practical techniques that could aid Soviet agriculture, but also a full-blown theoretical alternative to classical genetics. Given the worsening relations with Germany after Adolf Hitler's seizure of power in 1933, the German enthusiasm for eugenics provided Lysenko with another anti-genetic target. There had earlier indeed been extensive discussion and some support for eugenics in the Soviet Union's first decade, but the doctrine was suppressed by Stalin in 1930.¹³ (It persisted, however, in various guises. Famed American geneticist and future Nobel laureate Herman J. Muller moved to the USSR in 1933 in part to advocate for a socialist form of eugenics, embodied in his book *Out of the Night*. The project failed, and Muller fled the Soviet Union via the Spanish Civil War in 1937.)¹⁴

Michurinism was not unopposed among geneticists. During the 1920s and 1930s, the Soviet Union was one of the world centers of genetics, boasting sophisticated groups of researchers clustered around Nikolai Kol'tsov (1872-1940), Sergei Chetverikov (1880-1959), and Nikolai Vavilov (1887-1943), who pioneered population genetics and analysis of geographic distribution and variation.¹⁵ All three came of age within the Russian Empire, but their careers flourished in the early Soviet Union, and they trained several future luminaries of the field who were exact contemporaries of Lysenko, including Nikolai Timofeef-Resovskij (1900-1981) and especially Theodosius Dobzhansky (1900-1975), who emigrated to the United States in 1927 and played a prominent role in the internationalization of the opposition to Lysenko.¹⁶ When Lysenko began to rise to prominence, he was initially welcomed into the fold at VASKhNIL, especially by Vavilov, who was its president from 1929 to 1935.

Vavilov's early encouragement of Lysenko gives the episode an additional tragic quality. Vavilov was, in many ways, the model Soviet scientist. (His physicist brother, Sergei, was

¹¹ Frolov, *Genetika i dialektika*.

¹² Wetter, *Dialectical Materialism*; Sheehan, *Marxism and the Philosophy of Science*; Joravsky, *Soviet Marxism and Natural Science*; Graham, *Science and Philosophy in the Soviet Union*.

¹³ Adams, *The Wellborn Science*; Kremmentsov, *With and Without Galton*; Graham, "Science and Values."

¹⁴ deJong-Lambert, *The Cold War Politics of Genetic Research*, 33-38, 43-46.

¹⁵ Adams, "The Founding of Population Genetics"; Adams, "Sergei Chetverikov, the Kol'tsov Institute, and the Evolutionary Synthesis."

¹⁶ On Timofeef, see Granin, *The Bison*; on Dobzhansky, see Adams, *The Evolution of Theodosius Dobzhansky*; and deJong-Lambert, *The Cold War Politics of Genetics Research*.

similarly situated, and served as president of the Soviet Academy of Sciences from 1945 until his death in 1951.)¹⁷ Emerging from a bourgeois merchant background, he embraced the Revolution and threw himself into organizing the scientific study of plant strains. He began collecting seeds from around the world in an effort to establish the evolutionary origins of different plants, noting that one would expect greater genetic variability closer to the point of origin. (His collection, which survived the catastrophic siege of Leningrad during World War II — now christened the N. I. Vavilov All-Russian Institute of Plant Genetic Resources — remains one of the major repositories of plant genetic material in the world.)¹⁸ Vavilov is often read as a Mendelian mirror-image to the Michurinist Lysenko: polyglot, respected internationally, yet also dedicated to improving agriculture. It was this last point which probably accounts for his early support of Lysenko, as the brash agronomist provided some ideological protection for the work of the geneticists, while at the same time fostering a culture of debate and engagement. That Stalin in 1935 at a public event called out “Bravo, Comrade Lysenko, bravo” did not hurt the parvenu’s ascent.¹⁹ Indeed, that same year Vavilov was replaced at VASKhNIL with Aleksandr Muralov, and then from 1938 to 1956 (and again from 1961 to 1962) by Lysenko.

The late 1930s witnessed increasingly acrimonious attacks by Michurinists on Mendelians — and, though less often stressed in Anglo-American accounts, by Mendelians on Michurinists. Vavilov consistently tried to preserve a balance between the factions, and paid the ultimate price for it. At various points one of the two factions gained the upper hand, though the Michurinists seemed to do so with increasing frequency as the inevitable war with Nazi Germany loomed. A proposed congress on genetics in 1937 ended up being postponed and moved from Moscow to Edinburgh — both the initial invitation and the relocation were supported by Vavilov, and the result was surely a loss of face. Michurinist attacks on Vavilov escalated, and on 6 August 1940 he was arrested while on an expedition to Ukraine, and sentenced to death in July 1941. Although the sentence was commuted to imprisonment the following year, in 1943 he died of malnutrition.²⁰ Although rumors of Vavilov’s death diffused out to friends and supporters in the West, it was not confirmed until after World War II. To the end of his life, Lysenko disclaimed all responsibility in the fate of Vavilov, although these disavowals have never been widely credited.

Vavilov’s death was both a human tragedy and a blow to the geneticists, who lost their most skilled and prominent advocate. Yet in 1945 the situation did not look too bleak for those associated with the Mendelian camp. The Stalinist terror campaigns of the late 1930s were

¹⁷ Kojevnikov, “President of Stalin’s Academy”; Joravsky, “The Vavilov Brothers.”

¹⁸ The N. I. Vavilov All-Russian Institute of Plant Genetic Resources has an online presence at <https://www.vir.nw.ru/en/>.

¹⁹ Krementsov, *Stalinist Science*, 159.

²⁰ Pringle, *The Murder of Nikolai Vavilov*.

over, and the immediate postwar era came with a relaxation of controls in several areas. Geneticists claimed they could help with agricultural productivity and such promises were welcome. And Lysenko's own star was a little tarnished once his brother chose not to return to the Soviet Union after having been captured as a prisoner of war by the Germans. Indeed, some geneticists within the Soviet Union, such as Anton Zhebrak (1901-1965), thought that the president of VASKhNIL was newly vulnerable to attacks both domestic and foreign, provided they were seen as *scientific* critiques and not *political* ones. Zhebrak contacted colleagues abroad, especially Dobzhansky, to begin an ostensibly apolitical campaign to attack Lysenko's ideas on biological grounds. Dobzhansky translated a short volume of Lysenko's, *Heredity and Its Variability*, in 1947, and then with Columbia geneticist Leslie Clarence Dunn (1903-1974) arranged for and then secretly edited a series of reviews of the translation which condemned its science but omitted editorialization on Stalin's regime.²¹ The campaign seemed to be succeeding, and in early 1948 Lysenko appeared to be on the ropes.

LYSENKO TRIUMPHANT

These external attacks might have been a tad too successful. Lysenko now encountered high-profile opponents from within the Soviet *apparat*. Drawing on some of the criticisms earlier voiced by Zhebrak, on 10 April 1948 Iurii Zhdanov (1919-2006) gave an extended lecture to the elite of Communist Party's propaganda apparatus at the Moscow Polytechnic Museum entitled "On Issues of Modern Darwinism." He not only endorsed specific arguments from Lysenko's competitors, but explicitly criticized the agronomist's views on both natural selection and genetics.²² This was an ominous development for Lysenko, since his antagonist was the son of Andrei Zhdanov (1896-1948), widely rumored to be Stalin's successor — perhaps he would have been, had he not predeceased Stalin — and prominent for his ideological initiatives. The elder Zhdanov had already launched a series of measures to tighten ideological orthodoxy, generally known as the *Zhdanovshchina*, and if the father were to back the son, Lysenko's efforts to entrench his own position would fail. The classical geneticists' campaign seemed on the cusp of success.

Rather the opposite happened. Lysenko began shoring up support from those opposed to Iurii Zhdanov, including major figures like Georgii Malenkov (1901-1988), who helped set the pieces in place for a definitive statement in favor of the Michurinists. By late May or early June, Stalin had received a copy of the younger Zhdanov's lecture and decided to put an end to the debates. The Central Committee began to draft a resolution to this effect — to be written by Malenkov and *Andrei* Zhdanov — but Stalin decided instead to present the new *fait accompli* through the vehicle of a scientific conference. A VASKhNIL meeting entitled "On the Situation in Soviet Biological Science" was quickly planned to begin on 31 July 1948, and

²¹ Lysenko, *Heredity and Its Variability*; Gordin, "How Lysenkoism Became Pseudoscience."

²² Krementsov, *Stalinist Science*, 153.

Stalin himself line-edited (and indeed toned down) Lysenko's closing address for the conference (quoted earlier).²³ Each session featured attacks on the Mendelian position and support for the Michurinists, including theatrical "self-criticisms" where some classical geneticists recanted their earlier convictions. The climax came with the question period after Lysenko's plenary. A question was handed up to the dais, and read out by Lysenko: "What is the attitude of the Central Committee of the Party to my report?" Lysenko replied: "*The Central Committee of the Party has examined my report and approved it,*" which was followed with the *de rigueur* "Stormy Applause. Ovation. All Rise."²⁴ The full proceedings were quickly translated and published in English by the Soviets themselves, and widely distributed.²⁵

This August 1948 pronouncement — that Stalin had endorsed Lysenko's position against the Mendelians — is at the crux of the attention devoted both at the time and by historians to "the Lysenko affair." The central concern that occupies the lion's share of the historiography is: How could this happen? How was it possible that, in one of the most scientifically advanced nations in the world, with an especially developed agricultural research sector and a vibrant tradition of genetics, the state could not only intervene in a scientific dispute, but intervene *on the wrong side*? Ever since 1948, both historians and scientists have advanced a number of interpretations, most of which draw heavily on the specific context of science in the Soviet Union — with the strong implication that a 1948-style "Lysenkoist" event could not happen in non-Communist countries.

A dominant interpretation in the 1950s was that Marxism itself was at fault. Conway Zirkle, an American botanist and historian of science based at the University of Pennsylvania, was among the earliest exponents of this view. According Zirkle, first in his 1949 book *Death of a Science in Russia* — which extracted material from *Pravda* and other sources and focused specifically on the VASKhNIL events — and then a decade later in *Evolution, Marxian Biology, and the Social Scene* (more of an intellectual history), Lysenko's triumph was caused by the absence of intellectual freedom in Stalin's Soviet Union and the specific predilections of Marxist thought. Restrictions on intellectual exchange provided fertile ground for pathological doctrines to grow, but they did not explain which specific doctrines might take root. For Zirkle, Marxism was predisposed toward a Lamarckian understanding of heredity, and thus intrinsically hostile to genetic explanations as opposed to environmental ones.²⁶

As an accurate explanation of what happened to Soviet genetics, however, Zirkle's argument was deeply flawed. Loren Graham, in a 1972 book that was expanded and re-issued in 1987, pointed to a large number of instances in which dialectical materialism failed to exert a

²³ Rossianov, "Editing Nature."

²⁴ Quoted in Kremmentsov, *Stalinist Science*, 172. Emphasis in original.

²⁵ *The Situation in Biological Science*.

²⁶ Zirkle, *Death of a Science in Russia*; Zirkle, *Evolution, Marxian Biology, and the Social Science*.

baleful influence on Soviet science, and in some cases even served as a resource that promoted successful research. After all, invocations of the philosophy Lenin or Engels (or, during his lifetime, Stalin) were almost obligatory in Soviet publications, and yet Lysenko-style takeovers did not happen in most other fields.²⁷ On the contrary: as Ethan Pollock has shown, in several disciplines in which a putative Lysenko-figure was waiting in the wings and a large ideological meeting had been organized, à la VASKhNIL, the Party either opted not to intervene (physics) or threw its support *against* the would-be Lysenko (linguistics).²⁸ The tremendous successes of Soviet physics during precisely the years in which genetics was besieged indicates that there was no direct correlation of Marxist philosophy and state-sponsored ideological decimation of science.²⁹ Graham also noted another defect in Zirkle's argument: if dialectical materialism and Soviet philosophy produced Lysenko's rise in 1948, then how was one to account for the fact that the Soviet system also removed Lysenko from power in 1965?³⁰

Marxists in Western Europe and the United States countered Zirkle's position from within, most prominently in Dominique Lecourt's *Proletarian Science?* (1977). Originally published in French during a decade of efflorescence in neo-Marxist thought, Lecourt took on the Lysenko episode as the classic problem case for Marxist apologetics: if Marxism could lead to Lysenko, then does that not indict the political and philosophical project? Lecourt noted that the explanations of Lysenko always focused on individuals and on philosophically individualistic notions like "cult of personality" — the central analytical category of Soviet dissident biologist Zhores Medvedev's *samizdat* history.³¹ Instead, Lecourt offered as Marxist an explanation as he could for the abomination of Lysenko's takeover, stressing the effects of collectivization and the failure of the Soviet system to adhere to Marxist practices of self-criticism.³² A similar argument was also developed by American biologists Richard Lewontin and Richard Levins in an influential 1976 article.³³

A second broad school of thought discarded the emphasis on dialectical materialism as a red herring and instead explored the specificities of Soviet science organization, offering a sociological reading of the events. The central book espousing such a Soviet-specific

²⁷ Graham, *Science and Philosophy in the Soviet Union*; Graham, *Science, Philosophy, and Human Behavior in the Soviet Union*.

²⁸ Pollock, *Stalin and the Soviet Science Wars*.

²⁹ Kojevnikov, *Stalin's Great Science*; Gordin, "Was There Ever a Stalinist Science?"

³⁰ Graham, *What Have We Learned about Science and Technology from the Russian Experience?*, chap. 1.

³¹ Medvedev, *The Rise and Fall of T. D. Lysenko*.

³² Lecourt, *Proletarian Science?*

³³ Lewontin and Levins, "The Problem of Lysenkoism."

interpretation — and for decades the central reference on Soviet genetics for Anglophone readers — was David Joravsky's *The Lysenko Affair* (1970). Joravsky framed the rise of Lysenko as the confluence of two related factors: a crisis in agriculture produced by rapid collectivization, and the phenomenon of “bossism” in Bolshevik culture, which favored unilateral decision-making and provided openings for “cranks” to slither up the administrative ladder.³⁴ Soviet political culture had so corrupted scientific decision-making that a crackpot could gain control of the levers of official knowledge-production. Late and post-Cold War accounts, such as that by Valery Soyfer, updated the main features of the Joravsky version with additional evidence.³⁵

Nikolai Kremmentsov's *Stalinist Science* (1997) provided an important corrective to Joravsky's account, although the book's argument subscribes to the general assumption that there was something distinctive about Soviet science that made the shock of 1948 possible, whereas it would have been hard to replicate this phenomenon in “the West.”³⁶ Rather than ascribing the Michurinists' rise to a general Bolshevik political culture, Kremmentsov highlighted a distinctive feature of science in the Soviet Union: there was one and only one patron for science, the party-state itself. Unlike the pluralist market for science in the developed capitalist states, where philanthropies, universities, and businesses all vied with the state to support particular sciences, if you wanted resources in the Soviet Union for your particular intellectual project, there was only one place to go. This fostered a winner-take-all structure which shaped the strategies of *all* scientists in the Soviet Union. The key difference from Joravsky's account is that Kremmentsov's version is fully symmetric between the classical geneticists and the Michurinists. Each group was seeking state endorsement of its own position and condemnation of the other — and in the immediate postwar moment the geneticists indeed did come very close to ending Lysenko's career.

Kremmentsov stressed a key feature of the general condemnation of “Lysenkoism”: the state backed the (scientifically) wrong side. If Lysenko had been fired and his acolytes dismissed, the moral of the fable would be different. After all, states routinely endorse particular scientific views over those of opponents, such as the correctness of Darwinian natural selection over “creation science,” or the necessity of polio and measles vaccines over alternative treatments. The burden of Kremmentsov's symmetric account is to find a reason why Stalin decided one way and not the other. In *Stalinist Science*, the answer is the nascent Cold War. When juxtaposing the timelines of the “Lysenko Affair” and rising hostilities between the US and USSR, one can see a partial correlation of Michurinist victories with

³⁴ Joravsky, *The Lysenko Affair*.

³⁵ Soyfer, *Lysenko and the Tragedy of Soviet Science*. The much longer Russian edition is Soyfer, *Vlast i nauka*, which contains a great deal of documentation. It was published in the United States in 1989, in the tradition of émigré or *samizdat* literature.

³⁶ Kremmentsov, *Stalinist Science*.

events like the Berlin Blockade or American support for the anti-Communists in Greece. According to Kremmentsov, Stalin opted to highlight the contrasts between two world systems: two competing economic systems, two competing militaries, two competing systems of alliances... and now two competing sciences.

Kremmentsov's account has been criticized from multiple angles, though it remains a powerful narrative that has largely displaced Joravsky's version. The most prominent alternative stresses the very aspect that Kremmentsov minimizes: the scientific debate. Nils Roll-Hansen, in *The Lysenko Effect* (2005) mostly focuses on the period well before 1948, highlighting the rise of Lysenko within agricultural science institutes until his assumption of control over VASKhNIL (and the displacement of Vavilov) in the late 1930s.³⁷ He stresses the complexities of plant physiology, and how Lysenko's vernalization techniques were made to seem plausible within a particular context of science policy. Instead of viewing the Michurinists' victory as an epiphenomenon of geopolitics, he focuses on how plant breeding came to be understood as a competitor to the laboratory-based science of genetics. Similarly, Kirill Rossiianov stressed that Kremmentsov's version de-emphasizes the fundamental methodological debates about control groups and statistics that were an important intellectual context for Lysenko's outmaneuvering of his opponents.³⁸

The disputes among these camps is unlikely to be resolved anytime soon. New archival findings are constantly added to the repository of available sources, and provide a mixture of support for one view or another. Each approach finds itself struggling to explain one of two questions. First, if the root causes were structural to Bolshevik culture or the patronage of Soviet science, why did this takeover happen in genetics but not in physics, chemistry, geology, linguistics, or other intellectual fields where there were aspiring Lysenko-types waiting in the wings? On the other hand, from Kremmentsov's point of view, if the roots of agrobiolgy's rise to dominance were in the specifics of plant physiology, why did it happen precisely in 1948 and not much earlier or much later? Barring some stunning revelation of Stalin's exact rationale in both the 1930s and 1940s, historians will continue to balance multiple, blended explanations.

LYSENKO ABROAD

Trofim Lysenko did not travel widely, but his ideas did. Communities of geneticists around the world had been following the trajectory of agrobiolgy for some time leading up to the VASKhNIL meeting, but the newly congealed Cold War standoff meant that a high-profile debate like this — even about a specialized topic like the immutability of heredity in plants — could not be ignored. Knowledge of agrobiolgy traveled along two main networks: those of scientific communication, which had been the main vector for the earlier attention

³⁷ Roll-Hansen, *The Lysenko Effect*.

³⁸ Rossiianov, "The Problem of Lysenkoism."

Lysenko had received overseas; and now Soviet propaganda networks. International reactions were highly variable, making them a prime way to analyze global reactions to socialist science.³⁹ The most important factor explaining the variation was the importance of the local Communist Party.

In the Soviet bloc, then newly dubbed “the second world,” Lysenko’s ideas received a great deal of exposure. At first, Michurinist ideas were promoted and classical genetics deposed, much like in the Soviet Union. This was an important matter for the Soviet leadership, but it was not a make-or-break issue like the nationalization of heavy industry or a chilling of diplomatic relations with the United States. While Stalin was alive, official support for Michurinism was high in the newly-socialist states of Eastern Europe and East Asia. After Stalin’s death in 1953 and especially after his successor Nikita Khrushchev’s “secret speech” in 1956 denouncing Stalin’s “cult of personality,” however, pressure from Moscow to promote Lysenko’s ideas abated. For example, in Poland and the People’s Republic of China (both highly agricultural) Michurinism began to fade rapidly in the late 1950s.⁴⁰

The situation in Western Europe depended on how powerful, and how independent from Moscow, the local Communists were. Many French Communists lined up behind the new biological line, but one of the leading Marxist biologists, Marcel Prenant (1893-1983), openly expressed his skepticism toward Lysenko’s ideas.⁴¹ Likewise, the Italian Communist Party (PCI) struggled among different factions about whether to adhere to the new line on genetics or to resist. By 1951 the PCI essentially chose silence rather than continued engagement on this matter.⁴²

The most public European debate, and the most well studied by historians, was in the United Kingdom. Several very prominent British scientists, especially biologists like J. D. Bernal (1901-1971) and J. B. S. Haldane (1892-1964), had openly avowed their Communist Party membership and their support of the Stalinist line starting in the 1930s. Their familiarity with the state-of-the-art in genetics, to which Haldane in particular had contributed, meant that the question of supporting Lysenko was deeply anguishing. Bernal never wavered; Haldane, by contrast, was distinguished by being the only prominent member of the Communist Party of Great Britain to resign specifically because of the 1948 VASKhNIL meeting.⁴³ Other fellow

³⁹ The most wide-ranging and systematic effort to date to encompass the variation is deJong-Lambert and Kremontsov, *The Lysenko Controversy as a Global Phenomenon*.

⁴⁰ deJong-Lambert, “Lysenkoism in Poland”; Schneider, “Michurinist Biology in the People’s Republic of China.”

⁴¹ Prenant, “The Genetics Controversy I.”

⁴² Cassatta, “The Italian Communist Party and the ‘Lysenko Affair.’”

⁴³ Kremontsov, “A ‘Second Front’ in Soviet Genetics”; Paul, “A War on Two Fronts”; Harman, “C. D. Darlington and the British and American Reaction to Lysenko and the Soviet Conception of Science.”

travelers, such as Julian Huxley (1887-1975), had flirted with Soviet ideas but were never formally in the Party and so were free to express their opposition without constraint.⁴⁴

Elsewhere in the world, debates about Michurinism were less a litmus test about affinity to Marxism than about suspicion of the United States. In Japan, for example, an extended and largely even-tempered debate over the merits of Lysenko's ideas (and the arguments against them) lasted for much of the 1950s.⁴⁵ Of course, as the Cold War heated up in East Asia with the conflicts in Korea and Vietnam — Japan served as an important ally for the Americans as well as the site of crucial military bases — politicized objections to agrobiolgy were not scarce. That said, a desire to cultivate intellectual independence from Washington kept a level of tolerance for discussion that was absent in countries that were either closer to the USSR or the US. The latter, indeed, soon emerged as the global leader in fomenting opposition to Lysenko and his ideas, although the end of Lysenko's dominance came about largely internally to the former.

ANTI-LYSENKO

The history of the second meaning of Lysenkoism — as a tag marking inappropriate politicization of science — has its roots in the foreign opposition to the developments in Soviet genetics in the 1940s. As we have already seen, Lysenko was never unopposed within the Soviet Union, either before or after August 1948, and certain scientists abroad such as L. C. Dunn and Theodosius Dobzhansky had attempted to strengthen that early resistance by shaping the international conversation in its favor. After the VASKhNIL meeting, this was no longer an option: many of the Soviet defenders of what was now officially declared the pseudoscience of “Mendelism-Morganism-Weismannism” were fired from their jobs. It would have been risky to those underdogs in the context of an intensifying Cold War had the Americans appeared overly solicitous to them.

Once Stalin's decision was made, the battle over “Lysenkoism” moved into a different register in the United States, and this framing was also exported internationally, much as the pro-Lysenko variant had been exported from Moscow. Anti-Lysenkoist reactions happened globally as well, of course, as discussed above. Within the US, though, the conversation was particularly one-sided given the absence of a significant Communist political presence (compared to the case in France, Italy, Japan, or the United Kingdom).

The first American reactions to Lysenko's elevation to dominance came from the same individuals who had pioneered the initial postwar opposition to Michurinism: Dobzhansky, Dunn, Muller, and a few other geneticists. Whereas the strategy before 1948 had been to stress the internationalism of science to provide ammunition to the Soviet Mendelians, the

⁴⁴ Huxley, *Heredity, East and West*.

⁴⁵ Iida, “A Controversial Idea as a Cultural Resource.”

post-VASKhNIL tactics shifted 180°: Soviet science — at least in genetics — was now cast as the diametrical opposite of true science (which was, naturally, presented as still international). Soviet biology was no longer to be considered “science” but was increasingly framed as a “pseudoscience.” This narrative became a template for other attacks on fringe knowledge claims in the early years of the Cold War and significantly shaped the conceptual deployment of the term “pseudoscience.”⁴⁶ The early Anglophone histories of what was now called “Lysenkoism,” such as Conway Zirkle’s, came out in precisely this period, helping cement the view that what was happening in the Soviet Union was not merely “bad science” but not science at all.

For example, the Genetics Society of America went through a lot of soul-searching to figure out how to talk about Lysenkoism: how to maintain its leaders’ strong commitment to pursuing “apolitical” science while still condemning Lysenko’s ideas as incorrect?⁴⁷ Stalin’s intervention was obviously political, but was it possible to condemn it without thereby also politicizing science? In the end, the Society did condemn the 1948 VASKhNIL meeting, but the tension Lysenkoism injected into the notion of apolitical science endured; indeed, flipping the script became United States foreign policy. During the first decades of the Cold War, the State Department and Central Intelligence Agency used Lysenko’s rise as a key propaganda exhibit for underdeveloped nations as to American science being better precisely because it was *not* political — even though this was a patently political claim.⁴⁸

In the early years of the Cold War in those states allied with the US, the binary of political/apolitical science triggered by the Lysenko affair fueled suspicion that scientists with Leftist leanings could not be trusted to be “objective,” an assumption on display in the hearings of the House Un-American Activities Committee — although those hearings disproportionately focused on physicists, underscoring the atomic-powered threats of the era.⁴⁹ Similar professional consequences attached to biologists who drifted too far from the emerging orthodoxy attacking Lysenko. An untenured chemist and member of the Communist Party was fired from the faculty of Oregon State College after publishing a letter in *Chemical & Engineering News* (the flagship trade journal for professional chemists) that defended some of Lysenko’s ideas.⁵⁰ Were American scientists free to advocate for heterodox ideas, even ones tied to the “wrong” politics?

⁴⁶ Gordin, “How Lysenkoism Became Pseudoscience.”

⁴⁷ Wolfe, “What Does It Mean to Go Public?”

⁴⁸ Wolfe, *Freedom’s Laboratory*.

⁴⁹ Wang, *Science in an Age of Anxiety*; Kaiser, “The Atomic Secret in Red Hands.”

⁵⁰ Sapp, *Beyond the Gene*, 177.

In plant physiology and related fields of genetics, at least in the United States, the general feeling in the 1950s was “not really.” For example, cytoplasmic inheritance — the idea that some aspects of heredity were transmitted through the cytoplasm and not just through the genetic material (identified increasingly with DNA) — had been an important theme in biology in preceding decades, but outside the Soviet orbit it became harder to advance such arguments because of the taint cast upon neo-Lamarckian ideas by Lysenko’s victory. One effect of the 1948 meeting was to dampen criticisms of classical genetics, even though there was a large group of scientists who had thought since the 1930s that cytoplasm might play an important role in evolution. They often continued their research, but the interpretations they gave to it were more measured. Tracey Sonneborn (1905-1981), in particular, resented his work on cytoplasmic inheritance being cited in favor of Lysenkoists.⁵¹ Something similar happened in contemporary debates about the mechanism of antibiotic resistance.⁵² The aftershocks of Lysenko’s victory did not just depress certain traditions in the US, they also accelerated others, such as boosting proposals to build large controlled laboratory spaces — “phytotrons,” in analogy with the particle accelerator “cyclotrons” — to conduct plant physiology on a “scientific” (read: anti-Lysenkoist) basis.⁵³

The most consequential opposition to Lysenko would come from within the Soviet Union, although it would take a decade and a half to bear fruit. Lysenko’s domination of biology was never total, even before Stalin’s death in 1953. For example, in 1952, criticism of Lysenko was allowed to appear in the *Botanicheskii zhurnal* (*Botanical Journal*). It was quickly rebuffed, but merely allowing its publication was a way for the state to keep Lysenko and his followers compliant.⁵⁴ After Stalin’s death, the new leader Nikita Khrushchev began a process of de-Stalinization of many aspects of Soviet life, including releasing many prisoners from the Gulag and partially opening up cultural discussion (“The Thaw”), but he held fast to Lysenko, and indeed entrenched his position. While Khrushchev was in power, there was little chance of toppling Lysenko.

Notwithstanding critics’ claims that all genetics research ended in the Soviet Union after August 1948, both scientific research and opposition to Lysenko continued, though they had to function somewhat covertly. Soviet research in molecular biology was definitely slowed in the 1950s, as some of the leading molecular geneticists lost their employment or had to work on different topics for a few years, but there was still important research accomplished on nucleic acids and similar topics.⁵⁵ Even mainstream genetics research was pursued, although

⁵¹ Sapp, *Beyond the Gene*, 166-74; Sonnenborn, “Heredity, Environment, and Politics”.

⁵² Creager, “Adaptation or Selection?”

⁵³ Munns, *Engineering the Environment*, 17-19.

⁵⁴ Kolchinskii and Konashev, “Kak i pochemu ‘Pravda’ uchila ‘Botanicheskii zhurnal?’”

⁵⁵ Adams, “Genetics and the Soviet Scientific Community.”

it required political cover, often from physicists — ideologically sheltered (if not bulletproof) by the development of the first Soviet fission (1949) and hydrogen (1955) bombs — who hired these scientists to pursue “radiation biology” on the long-term genetic consequences of radiation exposure. Such research was still dangerous within the metropolises of Moscow and Leningrad, where Lysenko quickly installed his followers, but was nurtured at the new Siberian science city Akademgorodok, established in 1958 in Novosibirsk.⁵⁶

Lysenko, though never a member of the Communist Party, remained in the good graces of the leadership until late 1964, when his principal patron Khrushchev was ousted in a coup by Leonid Brezhnev. Lysenko might have managed to turn even this change to his favor, as he had done in the past, but by now he had amassed a number of powerful enemies. Already in the early 1960s the opposition had begun to mobilize from within the Academy of Sciences, the apex of the basic research pyramid within the Soviet Union. In 1964 Lysenko nominated one of his cronies, N. L. Nuzhdin, for election to the Academy — something that would have unquestionably gone his way in the previous two decades — but the candidacy was shot down by the influential attacks of academicians such as nuclear physicist (and designer of the Soviet hydrogen bomb) Andrei Sakharov (1921-1989), later the most important dissident of the Brezhnev years and laureate of the 1975 Nobel Peace Prize. Sakharov and his colleagues pushed for an investigation into the management practices of Lysenko’s experimental farm in the Lenin Hills (Gorki Leninskie) outside Moscow. The results were catastrophic for Lysenko: there was evidence of fabrication of data to cover up the ruinous results of his projects.⁵⁷

Upon the withdrawal of Lysenko’s political cover, events happened quickly. Lysenko’s Institute of Genetics within the Academy was abolished, to be replaced by the Institute of General Genetics, helmed by Nikolai Dubinin (1907-1998), a geneticist who had been specifically attacked in the 1948 VASKhNIL meeting. Dubinin and another elder geneticist, Boris Astaurov (1904-1974), engaged in an extensive struggle about how far to purge the agrobiologists from biological institutions, with Astaurov arguing for complete expulsion and Dubinin for amnesty.⁵⁸ (Dubinin won.) Dubinin himself became a highly controversial figure, widely criticized (especially by émigrés such as Dobzhansky) for perpetuating some of Lysenko’s authoritarian tendencies and promulgating his own, admittedly Mendelian, fringe theories. Dubinin’s autobiography is a highly tendentious apologia focused on his own ego. Its title in Russian, *Perpetual Motion (Vechnoe dvizhenie)* was mocked by his critics as *Perpetual Self-Promotion (Vechnoe samovydvizhenie)*.⁵⁹ In Dubinin’s defense, he was working under

⁵⁶ Josephson, *New Atlantis Revisited*, chap. 3.

⁵⁷ Gordin, “Lysenko Unemployed,” 58.

⁵⁸ Gordin, “Lysenko Unemployed.”

⁵⁹ Dubinin, *Vechnoe dvizhenie*.

incredibly difficult conditions, having lost a generation of younger geneticists thanks to Lysenko's control of the curriculum. The Soviet biological establishment recovered, but very slowly.

Lysenko still managed his farm in the Lenin Hills, but without substantial resources. His membership in the Academy of Sciences was never rescinded. (Had it been, pressure to rescind Sakharov's membership a few years later might have been harder to resist.) He enjoyed the salary and privileges he had become accustomed to, but without any leadership role, scorned by most of the Soviet scientific world. He still had power and friends enough to suppress negative domestic press, but he could do nothing about the international gloating over his comeuppance. After his critic Zhores Medvedev (1925-2018) published *The Rise and Fall of T. D. Lysenko* with Columbia University Press in the United States, Lysenko managed to have him incarcerated involuntarily in a mental institution, until international outcry prompted his release and exile to the United Kingdom.⁶⁰ Lysenko died in Moscow on 20 November 1976.

LYSENKO'S LEGACY

After his removal from most of his positions of leadership, and certainly after his death, "Lysenkoism" in the first sense of the term largely disappeared. Pockets of agrobiological thought continued to percolate within the Soviet Union and in parts of the Global South, but never very intensely, and never for very long. However, the second sense of "Lysenkoism" — as a metonym for one of the great scientific controversies of the century — lived on. Although there are many different strands one might trace of its lingering aftereffects, three stand out for their continued significance.

The first, which began in the late 1980s and continued with vigor through the 1990s, was largely localized within the Soviet Union and then its primary successor state of the Russian Federation (with some resonances in independent Ukraine): a resurgence of historical research into the legacy of repressed science under Stalin and other Soviet leaders, particularly in genetics. The advent of *glasnost'* in 1987 propelled a flood of studies on the suppression of genetics in the 1930s through 1950s. These came in several forms: archival publications, memoirs (often long moldering in deceased scientists' closets), and historical studies that reevaluated Lysenko's rise to prominence. (The fall was far less often discussed.) Following in the wake of the emphasis on genetics came additional studies about mathematics, cybernetics, psychology, physics, chemistry, and so on, although most of these focused on the suppression of individual scientists and less scientific disciplines or theories.⁶¹

⁶⁰ Medvedev and Medvedev, *A Question of Madness*.

⁶¹ Emblematic of this research is Iaroshevskii, *Repressirovannaia nauka*.

The second has been the contemporary emergence of a surprising echo of Lysenko's hereditarian ideas. In recent decades, molecular biologists have explored a number of mechanisms by which hereditary information is transmitted beyond the form encoded within DNA; the name of this subfield is "epigenetics." There are many different ways to characterize it, most of which have no Michurinist overtones. However, some researchers in this field draw a connection between Lysenko's arguments about heredity being "shattered" by environmental shock, with the new trait transmitted to the subsequent generation, as a precursor of epigenetic findings. Lysenko was not arguing for precisely the same thing, of course, given that he did not consider DNA to have any hereditary implications nor was he conversant with the findings of his own day's molecular genetics. Nonetheless the parallels have proven suggestive for some, and in Russia certain biologists have treated recent epigenetic discoveries as a vindication for Lysenko.⁶² These claims remain marginal, both within Russia and abroad.

Finally, Lysenkoism's greatest legacy has been as a fighting word in the public sphere whenever questions of the state's role in science come to the fore. If any government moves to support one proposed scientific theory or to denigrate another — creationism, vaccines, anthropogenic climate change, acid rain, genomics, IQ and race — those on the losing end will cry "Lysenkoism," especially if the regulation is understood as coming "from the Left," however defined: the state is once again intervening inappropriately in a scientific debate that should be allowed to continue unmolested. The assumption of critics, of course, is that "real" scientific truths will emerge without political intervention, as if the political and scientific spheres can be neatly divided. Even as the memory of the original debates over genetics in the interwar Soviet Union fade into obscurity, it is likely that the name of the Ukrainian-born agronomist will live on in eponymy.

BIBLIOGRAPHY

Adams, Mark B., ed. *The Evolution of Theodosius Dobzhansky: Essays on His Life and Thought in Russia and America*. Princeton: Princeton University Press, 1994. ([Link to IsisCB](#))

Adams, Mark B. "The Founding of Population Genetics: Contributions of the Chetverikov School, 1924-1934." *Journal of the History of Biology* 1 (1968): 23-39.

Adams, Mark B. "Genetics and the Soviet Scientific Community, 1948-1965." PhD diss., Harvard University, 1972.

Adams, Mark B. "Sergei Chetverikov, the Kol'tsov Institute, and the Evolutionary Synthesis." In *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, edited by Ernst Mayr and William B. Provine, 242-78. Cambridge, MA: Harvard University Press, 1998 [1980]. ([Link to IsisCB](#))

⁶² Graham, *Lysenko's Ghost*; Gordin, "Lysenko Unemployed," 74-75.

Adams, Mark B., ed. *The Wellborn Science: Eugenics in Germany, France, Brazil, and Russia*. New York: Oxford University Press, 1990. ([Link to IsisCB](#))

Bailes, Kendall E. *Technology and Society under Lenin and Stalin: Origins of the Soviet Technical Intelligentsia, 1917-1941*. Princeton: Princeton University Press, 1978. ([Link to IsisCB](#))

Cassata, Francesco. "The Italian Communist Party and the 'Lysenko Affair' (1948-1955)." *Journal of the History of Biology* 45, no. 3 (2012): 469-98. ([Link to IsisCB](#))

Conquest, Robert. *The Harvest of Sorrow: Soviet Collectivization and the Terror-Famine*. New York: Oxford University Press, 1986.

Creager, Angela N. H. "Adaptation or Selection? Old Issues and New Stakes in the Postwar Debates over Bacterial Drug Resistance." *Studies in History and Philosophy of the Biological and Biomedical Sciences* 38 (2007): 159-90. ([Link to IsisCB](#))

deJong-Lambert, William. *The Cold War Politics of Genetic Research: An Introduction to the Lysenko Affair*. Dordrecht: Springer, 2012. ([Link to IsisCB](#))

deJong-Lambert, William. "Lysenkoism in Poland." *Journal of the History of Biology* 45, no. 3 (2012): 499-524. ([Link to IsisCB](#))

deJong-Lambert, William and Nikolai Kremontsov. "On Labels and Issues: The Lysenko Controversy and the Cold War." *Journal of the History of Biology* 45 (2012): 373-88. ([Link to IsisCB](#))

deJong-Lambert, William and Nikolai Kremontsov, eds. *The Lysenko Controversy as a Global Phenomenon* Vol. 2. New York: Springer, 2017.

Dubinina, Nikolai Petrovich. *Vechnoe dvizhenie*. Moscow: Izd. politicheskoi literatury, 1973.

Frolov, I. T. *Genetika i dialektika*. Moscow: Nauka, 1968.

Gershenson, S. M. "The Grim Heritage of Lysenkoism: Four Personal Accounts. IV. Difficult Years in Soviet Genetics." *The Quarterly Review of Biology* 65 (1990): 447-56. ([Link to IsisCB](#))

Gordin, Michael D. "How Lysenkoism Became Pseudoscience: Dobzhansky to Velikovsky." *Journal of the History of Biology* 45, no. 3 (2012): 443-68. ([Link to IsisCB](#))

Gordin, Michael D. "Lysenko Unemployed: Soviet Genetics after the Aftermath." *Isis* 109, no. 1 (2018): 56-78. ([Link to IsisCB](#))

Gordin, Michael D. "Was There Ever a 'Stalinist Science'?" *Kritika* 9 (2008): 625-39.

Graham, Loren R. *Lysenko's Ghost: Epigenetics and Russia*. Cambridge, MA: Harvard University Press, 2016. ([Link to IsisCB](#))

Graham, Loren R. "Science and Values: The Eugenics Movement in Germany and Russia in the 1920s." *American Historical Review* 82 (1977): 1133-64. ([Link to IsisCB](#))

Graham, Loren R. *Science and Philosophy in the Soviet Union*. New York: Knopf, 1972. ([Link to IsisCB](#))

Graham, Loren R. *Science, Philosophy, and Human Behavior in the Soviet Union*. New York: Columbia University Press, 1987. ([Link to IsisCB](#))

Graham, Loren R. *What Have We Learned about Science and Technology from the Russian Experience?* Stanford: Stanford University Press, 1998. ([Link to IsisCB](#))

Granin, Daniil. *The Bison: A Novel about the Scientist Who Defied Stalin*. Translated by Antonina W. Bouis. New York: Doubleday, 1990.

Harman, Oren. "C. D. Darlington and the British and American Reaction to Lysenko and the Soviet Conception of Science." *Journal of the History of Biology* 36 (2003): 309-52. ([Link to IsisCB](#))

Hudson, P. S. and R. H. Richens. *The New Genetics in the Soviet Union*. Cambridge: Imperial Bureau of Plant Breeding and Genetics, 1946.

Huxley, Julian. *Heredity, East and West: Lysenko and World Science*. New York: Schuman, 1949.

Iaroshevskii, M. G. *Repressirovannaia nauka = The Oppressed Science*. Leningrad: Nauka, 1991. ([Link to IsisCB](#))

Iida, Kaori. "A Controversial Idea as a Cultural Resource: The Lysenko Controversy and Discussions of Genetics as a 'Democratic' Science in Postwar Japan." *Social Studies of Science* 45, no. 4 (2015): 546-69. ([Link to IsisCB](#))

Joravsky, David. *The Lysenko Affair*. Cambridge, MA: Harvard University Press, 1970. ([Link to IsisCB](#))

Joravsky, David. *Soviet Marxism and Natural Science: 1917-1932*. New York: Columbia University Press, 1961.

Joravsky, David. "The Vavilov Brothers." *Slavic Review* 24, no. 3 (September 1965): 381-94.

Josephson, Paul R. *New Atlantis Revisited: Akademgorodok, the Siberian City of Science*. Princeton: Princeton University Press, 1997. ([Link to IsisCB](#))

Kaiser, David. "The Atomic Secret in Red Hands?: American Suspicions of Theoretical Physicists during the Early Cold War." *Representations* 90, no. 1 (2005): 28-60. ([Link to IsisCB](#))

Kojevnikov, Alexei. "President of Stalin's Academy: The Mask and Responsibility of Sergei Vavilov." *Isis* 87 (1996): 18-50. ([Link to IsisCB](#))

Kojevnikov, Alexei. *Stalin's Great Science: The Times and Adventures of Soviet Physicists*. London: Imperial College Press, 2004. ([Link to IsisCB](#))

Kolchinskii, E. I. and M. B. Konashev. "Kak i pochemu 'Pravda' uchila 'Botanicheskii zhurnal'?" *Voprosy istorii estestvoznaniia i tekhniki*, no. 4 (2003): 49-74. ([Link to IsisCB](#))

Krementsov, Nikolai. "A 'Second Front' in Soviet Genetics: The International Dimension of the Lysenko Controversy, 1944-1947." *Journal of the History of Biology* 29 (1996): 229-50. ([Link to IsisCB](#))

Krementsov, Nikolai. *Stalinist Science*. Princeton: Princeton University Press, 1997. ([Link to IsisCB](#))

Krementsov, Nikolai. *With and Without Galton: Vasili Florinskii and the Fate of Eugenics in Russia*. Cambridge: Open Book Publishers, 2018. ([Link to IsisCB](#))

Lecourt, Dominique. *Proletarian Science?: The Case of Lysenko*. Translated by Ben Brewster. London: NLB, 1977. ([Link to IsisCB](#))

Lewontin, Richard and Richard Levins. "The problem of Lysenkoism." In *The Radicalisation of Science: Ideology of/in the Natural Sciences*, edited by Hilary Rose and Steven Rose, 32-64. London: Macmillan, 1976. ([Link to IsisCB](#))

Lysenko, T. D. *Heredity and Its Variability*. Translated by Theodosius Dobzhansky. New York: King's Crown Press, 1946.

Lysenko, T. D. *The Science of Biology Today*. New York: International Publishers, 1948.

Medvedev, Zhores A. *The Rise and Fall of T. D. Lysenko*. Translated by I. Michael Lerner. New York: Columbia University Press, 1969.

Medvedev, Zhores A. and Roy A. Medvedev, *A Question of Madness*. Translated by Ellen de Kadet. London: Macmillan, 1971.

Munns, David P. D. *Engineering the Environment: Phytotrons and the Quest for Climate Control in the Cold War*. Pittsburgh: University of Pittsburgh Press, 2017. ([Link to IsisCB](#))

Oushakine, Serguei Alex. "The Flexible and the Pliant: Disturbed Organisms of Soviet Modernity." *Cultural Anthropology* 19 (2004): 392-428.

Paul, Diane. "A War on Two Fronts: J. B. S. Haldane and the Response to Lysenkoism in Britain." *Journal of the History of Biology* 16 (1983): 1-37. ([Link to IsisCB](#))

Pollock, Ethan. *Stalin and the Soviet Science Wars*. Princeton: Princeton University Press, 2006. ([Link to IsisCB](#))

Prenant, Marcel. "The Genetics Controversy I: The General Issues." *Science and Society* 13 (Winter 1948-1949): 50-54.

Pringle, Peter. *The Murder of Nikolai Vavilov: The Story of Stalin's Persecution of One of the Great Scientists of the Twentieth Century*. New York: Simon & Schuster, 2008. ([Link to IsisCB](#))

Roll-Hansen, Nils. *The Lysenko Effect: The Politics of Science*. Amherst, NY: Humanity Books, 2005. ([Link to IsisCB](#))

Rossianov, Kirill O. "Editing Nature: Joseph Stalin and the 'New' Soviet Biology." *Isis* 84 (1993): 728-45. ([Link to IsisCB](#))

Rossianov, Kirill. "The Problem of Lysenkoism: Why We Cannot Explain It Away?" *Annals of Science* 78, no. 1 (2021): 117-25.

Sapp, Jan. *Beyond the Gene: Cytoplasmic Inheritance and the Struggle for Authority in Genetics*. New York: Oxford University Press, 1987. ([Link to IsisCB](#))

Schneider, Laurence. "Michurinist Biology in the People's Republic of China, 1948-1956." *Journal of the History of Biology* 45, no. 3 (2012): 525-56. ([Link to IsisCB](#))

Sheehan, Helena. *Marxism and the Philosophy of Science: A Critical History*. Vol. 1, *The First Hundred Years*. Atlantic Highlands, NJ: Humanities Press, 1985. ([Link to IsisCB](#))

The Situation in Biological Science: Proceedings of the Lenin Academy of Agricultural Sciences of the U.S.S.R., Session: July 31–August 7, 1948. Moscow: Foreign Languages Publishing House, 1949.

Sonneborn, T. M. "Heredity, Environment, and Politics." *Science* 111 (1950): 529-39.

Soyfer, Valerii. *Lysenko and the Tragedy of Soviet Science*. Translated by Leo Gruliow and Rebecca Gruliow. New Brunswick, NJ: Rutgers University Press, 1994. ([Link to IsisCB](#))

Soyfer, Valerii. *Vlast' i nauka: Istoriia razgroma genetiki v SSSR*. Ann Arbor, MI: Hermitage, 1989.

Stites, Richard. *Revolutionary Dreams: Utopian Vision and Experimental Life in the Russian Revolution*. New York: Oxford University Press, 1989.

Todes, Daniel P. *Darwin without Malthus: The Struggle for Existence in Russian Evolutionary Thought*. New York: Oxford University Press, 1989. ([Link to IsisCB](#))

Voinov, M. S. *Akademik T. D. Lysenko: Pamiatka chitateliu*. Moscow: Tip. Biblioteki imeni V. I. Lenina, 1950.

Wang, Jessica. *American Science in an Age of Anxiety: Science, Anticommunism, and the Cold War*. Chapel Hill: University of North Carolina Press, 1999. ([Link to IsisCB](#))

Weiner, Douglas R. "The Roots of 'Michurinism': Transformist Biology and Acclimatization as Currents in the Russian Life Sciences." *Annals of Science* 42 (1985): 243-60. ([Link to IsisCB](#))

Wetter, Gustav A. *Dialectical Materialism: A Historical and Systemic Survey of Philosophy in the Soviet Union*. Translated by Peter Heath. New York: Praeger, 1958.

Wolfe, Audra J. "What Does It Mean to Go Public? The American Response to Lysenkoism, Reconsidered." *Historical Studies in the Natural Sciences* 40 (2010): 48-78. ([Link to IsisCB](#))

Wolfe, Audra J. *Freedom's Laboratory: The Cold War Struggle for the Soul of Science*. Baltimore: Johns Hopkins University Press, 2018. ([Link to IsisCB](#))

Zirkle, Conway. *Death of a Science in Russia: The Fate of Genetics as Described in Pravda and Elsewhere*. Philadelphia: University of Pennsylvania Press, 1949.

Zirkle, Conway. *Evolution, Marxian Biology, and the Social Scene*. Philadelphia: University of Pennsylvania Press, 1959.