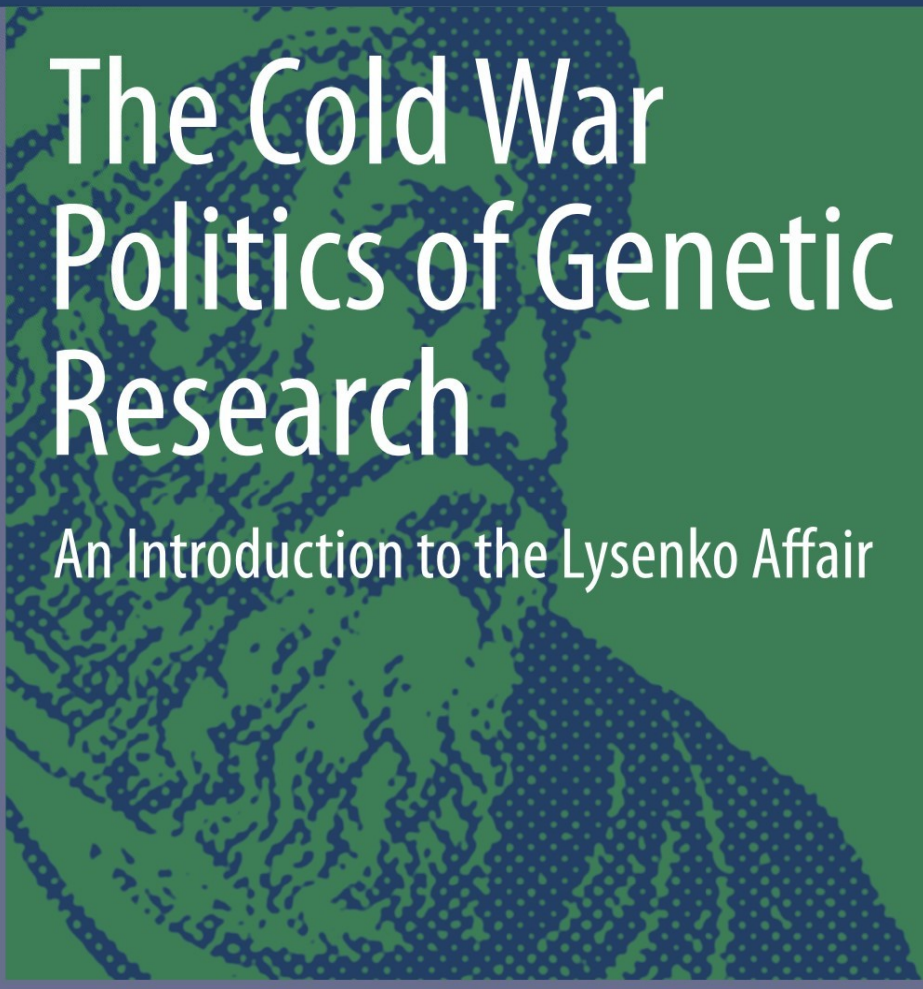
Archimedes 32 New Studies in the History and Philosophy of Science and Technology

William deJong-Lambert

The Cold War Politics of Genetic Research

An Introduction to the Lysenko Affair



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The Cold War Politics of Genetic Research

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To the tooth fairy

Acknowledgements

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The help of several organizations and archivists was also essential to the success of this project. At the American Philosophical Society, where I began research for this book as a Library Resident Fellow nine years ago, I would like to thank Martin Levitt, Valerie-Ann Lutz, Michael Miller and Earle Spamer. A Fulbright-Hays Doctoral Dissertation Research Grant then supported a year of research in Warsaw, where I examined the impact of Lysenko's anti-genetics campaign upon Polish biology. A Franklin Research Grant from the American Philosophical Society enabled me to conduct further work in the Julian Huxley papers at the Woodson Research Center in the Fondren Library at Rice University and the J.B.S. Haldane papers at University College London. At the Woodson, I would like to thank Amanda Focke, Lauren Meyers and Dara Flinn. In Special Collections at University College London I would like to thank Deborah Furness, Dan Mitchell and Mandy Wise. Research in the Hermann J. Muller papers at the Lilly Library at Indiana University was supported by an Everett Helm Visiting Fellowship, and I would like to thank Zachary Downey, Sue Presnell and Cherry Dunham Williams for their continued assistance.

If had to cite a single source that has most influenced my thinking on the Lysenko controversy it would be the International Workshop on Lysenkoism, held December 4-5, 2009, at the Graduate Center of the City University of New York and the Harriman Institute at Columbia University. This meeting would not have been possible if not for the support of Catherine Nepomnyashchy at the Harriman and Gillian

Small, Vice Chancellor for Research at the City University of New York. I would also like to thank former-Bronx Community College President, Carolyn Williams, as well as Joe Dauben and Brian Schwartz at the Graduate Center, for their encouragement and assistance. I am also extraordinarily grateful to all of those who came to present their research, served as commentators or panel speakers, and contributed their comments and insights at the workshop. Among those in the latter category was my graduate school advisor, Gita Steiner-Khamsi, whose continued enthusiasm for my work has been extremely gratifying.

For the idea of writing a textbook on the Lysenko controversy I have two people to thank—Leslie Clarence Dunn and my wife Cheryl. In his oral history interview Dunn talked about the impact that writing one of the first genetics textbooks had upon the development of the field. The idea that a textbook, i.e., making something easier to teach, could play such an important role in the construction of knowledge, would never have occurred to me otherwise. That said, I would not have thought of this in terms of my own work had it not been for the numerous conversations Cheryl and I had about textbooks in which she informed me (as a former textbook editor) about how they are put together and the role they play in academia. Considering the fact that the next two people who come to mind as requiring acknowledgement are my children—Halina and Riley—who are always willing to give me the extra few seconds to finish a sentence before heading outside to hit the playground, makes me realize how much my family has contributed to my scholarship. I could not have done it without them.

Contents

Timeline of Events

1809: Jean Baptiste Lamarck publishes *Philosophie Zoologique*, outlining his theory of evolution based upon the inheritance of acquired characteristics

February 21, 1848: publication of Karl Marx and Friedrich Engels' *The Communist Manifesto*

November 24, 1859: publication of Charles Darwin's *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*

1866: Gregor Mendel's paper "Experiments on Plant Hybridization" published in *Proceedings of the Natural History Society of Brünn*

1869: Francis Galton publishes *Hereditary Genius*, founding the eugenics movement

1878: Publication of Friedrich Engels' *Anti-Dühring*

June 22, 1887: Julian Huxley born

December 21, 1890: Hermann Joseph Muller born

November 5, 1892: John Burdon Sanderson Haldane born

November 2, 1893: Leslie Clarence Dunn born

October 28, 1895: Conway Zirkle born

September 29, 1898: Trofim Denisovich Lysenko born

1900: Rediscovery of Mendel's Laws

January 25, 1900: Theodosius Dobzhansky born

1910: Eugenics Record Office founded at Cold Spring Harbor, Long Island

1912: Julian Huxley becomes chair of Biology at the newly-founded Rice Institute in Houston, Texas

1915–1918: H.J. Muller joins Huxley at the Rice Institute

November 7, 1917: Soviet power established in Russia

1918–1920: H.J. Muller returns briefly to teach at Columbia University then moves to the University of Texas at Austin the where he stays until 1932

1922: H.J. Muller brings *Drosophila* stocks to the Soviet Union

January 21, 1924: Vladimir I. Lenin dies

May 26, 1924: 1924 Immigration Act Passed by U.S. Congress limiting immigration to the United States from Southern and Eastern Europe, and Asia

July 10–21, 1925: Scopes Trial in Dayton, Tennessee

May 2, 1927: Supreme Court rules in Buck v. Bell that the Virginia statute authorizing sterilization does not violate the Constitution

August 7, 1927: First mention of Lysenko in *Pravda*

September, 1927: L.C. Dunn visits the Soviet Union for the first time

December 27, 1927: Theodosius Dobzhansky arrives in New York on a Rockefeller grant

1928: J.B.S. Haldane visits the Soviet Union at the invitation of Nikolai Vavilov; Theodosius Dobzhansky accompanies T.H. Morgan West to Cal Tech; L.C. Dunn joins the faculty at Columbia

October 24, 1929: Stock Market Crash in the United States, start of the Great Depression

November 7, 1929: Joseph Stalin's article "The Year of the Great Break" appears in *Pravda*

1930: Conway Zirkle accepts position as associate professor of botany at University of Pennsylvania

Summer, 1931: Julian Huxley visits the Soviet Union

1932: J.B.S. Haldane moves from Cambridge University to University College, London

August 24–31, 1932: VI International Congress of Genetics held in Ithaca, New York

September 5, 1932: H.J. Muller leaves the United States for Europe

September 16, 1933: H.J. Muller moves to the Soviet Union

1936–1938: The Great Terror

July 17, 1936–April 1, 1939: The Spanish Civil War

November, 1936: VII International Congress of Genetics to be held in Moscow cancelled

December 19–26, 1936: H.J. Muller participates in debate with T.D. Lysenko at Lenin All-Union Academy of Agricultural Sciences

March–May, 1936: H.J. Muller joins International Brigade in Spain, briefly visits the United States and returns to the Soviet Union in September

September 23, 1937: H.J. Muller leaves the Soviet Union for good

November, 1937–August, 1940: H.J. Muller works at the University of Edinburgh, Scotland

August 15–29, 1939: VII International Congress of Genetics held in Edinburgh, Scotland

September 1, 1939: Nazi Germany invades Poland, World War II begins

October 7–14, 1939: Nikolai Vavilov and T.D. Lysenko participate in discussion on "issues in genetics," sponsored by *Under the Banner of Marxism*

1940: Dobzhansky joins Dunn at Columbia

August 14, 1945: Japan surrenders after atomic bombs are dropped on Hiroshima and Nagasaki, World War II ends

September, 1945: H.J. Muller takes position at Indiana University, Bloomington, where he remains for the rest of his career

October, 1945: Anton Zhebrak publishes article in *Science* discounting Lysenko's impact upon Soviet genetics

1946: *Heredity and Its Variability*, written by T.D. Lysenko, translated into English by Theodosius Dobzhansky, is published by King's Crown Press; Julian Huxley begins two-year term as director of the newly-founded United Nations Educational, Scientific and Cultural Organization (UNESCO)

December, 1946: H.J. Muller awarded the Nobel Prize

May 14, 1948: State of Israel founded

February, 1948: Communists take power in Czechoslovakia

June 24, 1948: Soviets blockade Berlin until May 5, 1949

July 7–14, 1948: VIII International Congress of Genetics held in Stockholm, Sweden

July 31–August 7, 1948: Lenin All-Union Academy of Agricultural Sciences in Moscow holds a meeting "On the Situation in Biological Science"

1950: Mendel Semi-Centennial held to celebrate 50 years since the rediscovery of Mendel's Laws

February 9, 1950: U.S. Senator Joseph McCarthy, speaking before the Republican Women's Club of Wheeling, West Virginia, waves a piece of paper he claims contains a list of communists working in the State Department

March 5, 1953: Stalin dies

April 25, 1953: James Watson and Francis Crick publish their account of the double-helix structure of DNA

May 17, 1954: United States Supreme Court rules in landmark civil rights case, Brown v. the Board of Education, that separate but equal is inherently unequal, ending the legal system of segregation by race

October 23–November 4, 1956: Hungarian Revolution

October 29, 1956: Israel invades the Gaza Strip, initiating Suez Crisis, lasting until March, 1957

July 25, 1957: J.B.S. Haldane immigrates to India

October 4, 1957: Soviet Union launches Sputnik

April 12, 1961: Yuri Gagarin becomes first human to travel into space

1962: L.C. Dunn retires from Columbia; Theodosius Dobzhansky moves to the Rockefeller Institute until his retirement in 1971

December 2, 1964: J.B.S. Haldane dies

1965: U.S. President Lyndon Johnson awards Dobzhansky the National Medal of Science for his work in population genetics and the study of evolution

February 4, 1965: T.D. Lysenko removed from position as director of the Institute of Genetics of the Academy of Sciences

April 5, 1967: H.J. Muller dies

March 28, 1972: Conway Zirkle dies

March 19, 1974: L.C. Dunn dies

February 14, 1975: Julian Huxley dies

December 18, 1975: Theodosius Dobzhansky dies

November 20, 1976: T.D. Lysenko dies

Introduction

To that great company of Russian geneticists
and cytologists, now dispersed and destroyed,
to those who lost their positions and are denied
the exercise of their profession,
to those who simply disappeared,
to those who died under mysterious circumstances,
to those who, to save their families, recanted:
this book is respectfully dedicated.

—Preface to Conway Zirkle's *Death of a Science in Russia*, 1949

Most readers consulting the 1961 *Encyclopedia Britannica* on Lamarckism probably did not notice the entry had been heavily revised from previous editions. That it would be updated is not surprising. A new name, Conway Zirkle, now appeared in the writer credits, next to T.H. Morgan, who had previously been listed as the sole author. Individual scientists are bound to interpret the history of their disciplines quite differently, and new collaborators often bring new ideas. What is striking in this instance however, is the nature of the edits, what is not discussed, and one detail many readers were probably unaware of.

Morgan's entry had focused exclusively on the persistence of belief in Lamarckism, as well as the scientific evidence against it. After reviewing popular examples (the blacksmith's son who inherits stronger arms from his father's repeated use of heavy hammers; the musically-gifted child who has the hours of time their parent spent practicing to thank for their talent), Morgan described Lamarck's influence upon Darwin, and later attempts to prove the inheritance of acquired characters by Kammerer, Dürken, Pavlov, and McDougall. Morgan concluded with a paragraph attributing the endurance of the doctrine to the fact that social evolution occurs thanks to the transmission of information from one generation to the next—stories, folk tales, historical works like the one you are reading right now—and

explained that therefore it is natural we would apply this to the inheritance of physical features.[1]

In the 1961 edition, a few new sentences appeared amidst the discussion on Darwin, and the Soviet Union was mentioned for the first time.

> In the Soviet Union, for example, where the inheritance of acquired characteristics is accepted and where it has an official standing, it is presented as a part of the Darwinian theory and is referred to generally as "creative Soviet Darwinism," distinct from the "reactionary Darwinism" of capitalist countries.[2]

This point was elaborated further on in text inserted between what had been the penultimate and final paragraphs of the entry as it had been published in the previous edition, three years before. The new section described how a "prolonged and bitter scientific controversy raged in the Soviet Union from 1936 to 1948," which resulted in Lamarckism being "revived rather violently by the Communist authorities." According to the "authors," Marx and Engels were "staunch Lamarckians" because they believed "this type of inheritance would guarantee the future improvement of the human race," Soviet biologists supported it because it put them in a "strong tactical position in the socialist competition for status," and the outcome of the 1948 conference at the Lenin All-Union Academy of Sciences (VASKhNIL) where genetics was banned was a "boon to the communist theoreticians."[3]

While most of Conway Zirkle's analysis reflected his superficial views of the controversy, what is most interesting about the entry is something most readers would probably not have recognized: Morgan was dead when the entry appeared. Once again, there is not necessarily anything unusual about this. Very often authors and editors names remain attached to updated versions of works they no longer have a hand in writing or editing. In this case though two things are important. One, T.H. Morgan's name and reputation vastly exceeded Zirkle's, and gave the definition far greater authority than it would have were Morgan's name removed; Two, Morgan, had he been alive, would never have agreed to have his name attached to the version containing Zirkle's revisions.

It is obvious Zirkle must have been conscious of the first point. What did he need Morgan's name on the entry for anyway? He had published two articles on the history of the inheritance of acquired characteristics in *The American Naturalist*, as well as an essay in the *Transactions of the American Philosophical Society*.[4] It would have been no problem at all for him to entirely revise the entry and make it his own work. That, however, would give it less credibility because Morgan—as a Nobel Prize winner—was far more famous than Zirkle. As for the second point, Morgan's biographer Garland Allen has described how Morgan loathed political

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[1] "Lamarckism," *Encyclopedia Britannica* 13 (1958): 607–10.

[2] "Lamarckism," *Encyclopedia Britannica* 13 (1961): 607.

[3] Ibid, p. 609.

[4] Conway Zirkle, "The Inheritance of Acquired Characteristics and the Provisional Hypothesis of Pangenesis," *The American Naturalist* 69, no. 724 (1935): 417–45; Conway Zirkle, "Further Notes on Pangenesis and the Inheritance of Acquired Characters," *The American Naturalist* 70, no. 731 (1936): 529–46.

activism. Morgan believed scientists should remain apolitical, because involvement in social causes had no place in scientific practice. In this instance it seems clear that Zirkle used Morgan to do something—attack "Marxian biology"—that Morgan, were he alive, would have wanted no part of.[5]

This brings us back to the above-quoted preface from Zirkle's 1949 book, *Death of a Science in Russia*. "Russian geneticists and cytologists, now dispersed and destroyed… lost their positions and are denied the exercise of their profession…," he wrote. But how many of them did Zirkle even know? To what extent did he really care? Was it not only their suffering that mattered to Zirkle, because it was useful to him?

When Zirkle wrote of, "those who died under mysterious circumstances," he was referring above all to renowned Russian geneticist Nikolai Vavilov. But is it not true that Vavilov was important to Zirkle only because he was gone? If Vavilov were alive, well and increasing agricultural production in the USSR, Zirkle would have attacked him. The thanatology of Lysenkoism is an important topic, but the more pressing question is—what was the "Lysenko affair,"[6] and why did anyone want to get involved in it?[7]

Zirkle, and *Death of a Science in Russia*, are a good place to begin working on an answer. Why did Zirkle organize a polemic against Lysenko? Zirkle was an ardent Cold Warrior and anti-communist. Despite the fact that his records are archived in the American Philosophical Society in Philadelphia, it is still fair to say that Zirkle is at least as best remembered for these activities as he is for his work as a botanist and historian of science. Of course Zirkle wanted to write history. That is the best way to influence the present.

December 4–5, 2009 I organized the International Workshop on Lysenkoism at the Graduate Center of the City University of New York and the Harriman Institute at Columbia University. The event brought together some 30 historians from nearly a dozen countries to present case studies on the impact of impact of, and reaction to,

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[5] See Conway Zirkle, *Evolution, Marxian Biology and the Social Science* (Philadelphia, PA: University of Pennsylvania Press, 1959); Conway Zirkle, "The Early History of the Idea of the Inheritance of Acquired Characters and of Pangenesis," *Transactions of the American Philosophical Society* 35, no. 2 (1946): 91–151.; Garland Allen, *Thomas Hunt Morgan: The Man and His Science* (Princeton, NJ: Princeton University Press, 1978).

[6] See William deJong-Lambert, "The Uses of the Dead in the Science of Life: A Thanatology of Lysenkoism," *Studies in the History of Biology* 3, no. 2 (2011): 97–108. One detail I did not mention above is that when I first investigated Zirkle's revisions to the Lamarckism entry in the 1961 *Encyclopedia Britannica*, I discovered (thanks to Richard W. Burkhard, Emeritus Professor, Department of History, University of Illinois. E-mail correspondence June 11, 2010) that someone had literally sliced them out of the pages in the editions found in the U.S. Library of Congress.

[7] The term "Lysenko affair" refers almost exclusively to events following the 1948 VASKhNIL conference up until Lysenko's formal denouncement in 1965. The terms "Lysenkoism" and "Lysenko affair" are currently being re-examined by historians of science. I will not continue to place them in quotation marks after their first use in this manuscript, but they should be understood as relics of a framework in which the Lysenko controversy was interpreted which is now obsolete. As Nikolai Krementsov has pointed out, the former term first appeared in 1945 in article in *Scientific Monthly*. See William deJong-Lambert and Nikolai Krementsov, "On Labels and Issues: The Lysenko Controversy and the Cold War," *The Jourannal of the History of Biology* 45, no. 1 (2012).

the Lysenko controversy in Italy, China, Japan, Mexico, Holland, East Germany, West Germany, Poland, Hungary, Czechoslovakia, the United States and the Soviet Union. In 2005 I had defended my dissertation, *The New Biology: Lysenkoism in Poland*, inspired by Nikolai Krementov's chapter on the import and export of Lysenkoism, published in Michael David-Fox and György Péteri's edited collection, *Academia in Upheaval: Origins, Transfers, and Transformations of the Communist Academic Regime in Russia and East Central Europe*.[8] As I conducted my research I became aware that there was, as yet, little written on Lysenkoism outside of the Soviet Union, and that broadening the scope of national case studies would be essential to moving the topic forward.

The idea of holding the workshop originated at a eugenics workshop organized by Magdalena Gawin at Warsaw University, "Eugenics, Modernisation and Biopolitics," April 17–19, 2008. I presented a paper on Polish geneticist Stanisław Skowron's twin experiences with eugenics and Lysenkoism, and after my talk another presenter, Francesco Cassata, informed me of his forthcoming work on Lysenkoism in Italy.[9] I also spoke with Michal Simunek about research he and his colleagues at Charles University were conducting on the Czech reaction to Lysenko. At this point it became clear that a network of Lysenko scholars was forming, and that a comparative project on Lysenkoism—of which the 2009 workshop was the first part—would be possible.

This book is a small contribution to that effort, and will hopefully prove worthwhile to historians of science who wish to guide their students through the basics of Lysenkoism, and outline the reaction in the United States. Though the workshop was a significant step forward in broadening the scope of research on the Lysenko controversy, most of the historiography still consists of analyses of Lysenko's career in the Soviet Union.[10] The response in the United States is a good place to begin

[8] William deJong-Lambert, "The New Biology: Lysenkoism in Poland" (Ph.D. dissertation, Columbia University, 2005). The dissertation has also been published by VDM Verlag; Nikolai Krementsov, "Lysenkoism in Europe: Export–Import of the Soviet Model," in *Academia in Upheaval: Origins, Transfers, and Transformations of the Communist Academic Regime in Russia and East Central Europe,* eds. Michael David-Fox and György Péteri's (Westport, CT: Bergin and Garvey, 2000).

[9] Francesco Cassatta, *Le due scienze. Il "caso Lysenko" in Italia* (Turin, Italy: Bollati Boringhieri, 2008).

[10] The standard bibliography when it comes to comprehensive accounts includes Conway Zirkle, *Death of a Science in Russia* (Philadelphia, PA: University of Pennsylvania Press, 1949); Julian Huxley, *Heredity East and West: Lysenko and World Science* (New York: Henry Shuman, 1949); David Joravsky, *The Lysenko Affair* (Chicago: The University of Chicago Press, 1970); Zhores Medvedev, *The Rise and Fall of T.D. Lysenko*, trans. Isadore Michael Lerner (New York: Doubleday and Co., 1971); Mark Adams, "Genetics and the Soviet Scientific Community, 1948–1965" (Ph.D. dissertation, Harvard University, 1972); Chapter 6 of Loren Graham's, *Science and Philosophy in the Soviet Union* (New York: Knopf, 1972); Dominique Lecourt, *Proletarian Science? The Case of Lysenko*, trans. Ben Brewster (London: NLB, 1977); V.A. Soyfer, *T.D. Lysenko and the Tragedy of Soviet Science*, trans. Leo Gruliow and Rebecca Gruliow (New Brunswick, NJ: Rutgers University Press, 1994); Krementsov, *Stalinist Science*; and Nils Roll-Hansen, *The Lysenko Effect: The Politics of Science* (New York: Prometheus Books, 2004). The works by Zirkle and Huxley are now treated as primary sources by historians of the Lysenko controversy.

when analyzing the international dimensions of the Lysenko affair, not only because the U.S. and the Soviet Union were the principle rivals in the Cold War, but also because Lysenko's anti-genetics campaign provoked the most controversy among scientists in its primary enemy.[11] Part of this was due to concurrent trends in U.S. Cold War culture, such as McCarthyism and loyalty investigations of the atomic scientists and other academics.[12] Biologists were in a delicate position due to the fact that their public stance on Lysenkoism was viewed through the lens of anti-communist propaganda, as well as the belief of many of their colleagues that scientists should not engage in politics.[13]

A large number of biologists in the U.S. engaged in the Lysenko controversy, however this book deals almost exclusively with four—Hermann J. Muller, Leslie Clarence Dunn, Theodosius Dobzhansky and Conway Zirkle.[14] The book also

[11] This was not necessarily the case elsewhere. In West Germany, for example, the Lysenko controversy was overshadowed by the importance of local upheavals in science in academia—particularly the founding of the Free University of Berlin. Alexander Schwerin, "Lysenkoism and the Reform of Postwar German Genetics" (paper presentation, The International Workshop on Lysenkoism, December 5, 2009).

[12] See, for example, Jessica Wang, *American Scientists in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (Chapel Hill, NC: University of North Carolina Press, 1999); Zuoyue Wang, *In Sputnik's Shadow: The President's Science Advisory Committee and Cold War America* (New Brunswick, NJ: Rutgers University Press, 2008); and Alfred K. Mann, *For Better or For Worse: The Marriage of Science and Government in the United States* (New York: Columbia University Press, 2000).

[13] See Audra Jayne Wolfe, *Speaking for Nature and Nation: Biologists as Public Intellectuals in Cold War Culture* (Ph.D. dissertation, University of Pennsylvania, 2002); Audra Jayne Wolfe, "What It Means to Go Public: The American Response to Lysenkoism, Reconsidered," *Historical Studies in the Natural Sciences* 40 (2010): 48–78; and Rena Seyla, "Defending Scientific Freedom and Democracy: The Genetics Society of America's Response to Lysenko," *Journal of the History of Biology* 45, no. 1 (2012).

[14] Dobzhansky, of course, was Russian, however by the early 1930s he had decided to remain in the United States; Other prominent figures in the response to the Lysenko affair in the United States include Milislav Demerec, Robert C. Cook, Karl Sax, Tracy Sonneborn, Salvador Luria and Isadore Michael Lerner. [See Krementsov, *International Science,* as well as R.C. Cook, "The Genetics Congress," *Journal of Heredity* 28 (1937): 24–6; Robert C. Cook, "Walpurgis Week in the Soviet Union," *The Scientific Monthly* 68, no. 6 (1949); *Journal of Heredity* 40, no. 7 (1949). In the latter case, the entire issue of the journal was devoted to the Lysenko controversy, as described in Chapter 11; For Sonneborn and Sax see, T.M. Sonneborn, "Heredity, Environment and Politics," *Science* 111, no. 2890 (1950): 529–39, as well as Karl Sax's response to Leslie Clarence Dunn's positive 1944 appraisal of Soviet Science (L.C. Dunn, "Science in the USSR: Soviet Biology," *Science* 99, no. 2561 (1944): 65–7.), in Karl Sax, "Soviet Biology," *Science* 99, no. 2572, (1944):298–9. Sax's negative assessment was then later contradicted by Anton Zhebrak (Anton Zhebrak, "Soviet Biology," *Science* 102, no. 2649 (1945):357–8). These were all later reprinted in Conway Zirkle's, *Death of a Science in Russia* (Philadelphia, PA: University of Pennsylvania Press, 1949); Salvador Luria wrote the letter to J.B.S. Haldane asking his cooperation in criticizing Lysenko, which I describe below. Lerner was later responsible for the English translation of Medvedev, *The Rise and Fall of T.D. Lysenko*]. In England other prominent supporters and critics were John D. Bernal, James Fyfe, C.D. Darlington, Sir Henry Dale and John Langdon-Davies [see John Langdon Davies, *Russia Puts the Clock Back: A Study of Soviet Science and Some British*

discusses the role of two British geneticists, Julian Huxley and J.B.S. Haldane, but only in terms of how their actions influenced their U.S. colleagues.[15] I devote most of my attention to these six individuals for two reasons:

1. They were among those most actively engaged in the controversy over the longest period of time.
2. Their reactions display the polarity of responses the Lysenko affair provoked.

Muller and Haldane's reactions to Lysenko have so far received the most attention, whereas the responses of Dunn, Dobzhansky, Huxley, and Zirkle are less well-known.[16] As will be described below, Muller was initially very enthusiastic about the future of Soviet genetics, not to mention the Soviet socialist system. His experiences in the Soviet Union in the 1930s, however, convinced him he had been wrong, and by the time the Lysenko affair got underway Muller had gone the opposite direction, and become a vocal critic of the USSR. Haldane is a prominent figure in the controversy due to the fact that he was the only geneticist to come out in support of Lysenko, thus highlighting the problem scientists faced when their scientific knowledge clashed with their pride or their political beliefs. Dunn and Dobzhansky initially collaborated against Lysenko, however soon recognized that their views on many subjects—politics in particular—were incompatible. Dobzhansky ultimately became frustrated by Dunn's reluctance to criticize Lysenko as harshly as he would have liked, a situation exacerbated by the fact that Dunn sacrificed his scientific career by devoting too much of his time to liberal political causes.

Huxley's reaction was due to an interest in Russian genetics that dated back to the early 1930s, but was even more so the product of his friendship with Muller. Huxley came to Muller's defense at a critical period in the controversy, when Muller's harsh criticism of Lysenko led many to accuse him of failing to show the same "scientific objectivity" he found lacking in Lysenko. Zirkle (the only one who

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Scientists (London: Victor Gallancz Ltd., 1949); J.D. Bernal, "The Biological Controversy in the Soviet Union and Its Implications," *The Modern Quarterly* 4, no. 3 (1949):203–17, as well as J.L. Fyfe, "The Soviet Genetics Controversy," *Modern Quarterly* 3 (1948): 348; and James Fyfe, *Lysenko is Right* (London: Lawrence & Wishart, 1950); For Darlington see Oren Solomon Harman, "C.D. Darlington and the British and American Reaction to Lysenko and the Soviet Conception of Science," *Journal of the History of Biology* 36, no. 2 (2003): 309–52, and Oren Solomon Harman, *The Man Who Invented the Chromosome: A Life of Cyril Darlington* (Cambridge, MA: Harvard University Press, 2004)].

[15] The impact of the Lysenko controversy in Great Britain is a subject which deserves a book of its own and is beyond the scope of this present work. I also touch on some details of the French reaction, particularly the response of Louis Aragon, but only in terms of its influence upon events in the United States.

[16] For an account of Dobzhansky, Dunn and Muller's reactions to Lysenko see William deJong-Lambert, "Hermann J. Muller, Theodosius Dobzhansky, Leslie Clarence Dunn and the Reaction to Lysenkoism in the United States," *Journal of Cold War Studies*, (*forthcoming, summer 2012*). For an account of Dunn and Dobzhansky's translation of Lysenko's work *Heredity and Its Variability* within the larger issue of "pseudoscience," see Michal Gordon, "How Lysenkoism Became Pseudoscience: Dobzhansky to Velikovsky," *Journal of the History of Biology* 45, no. 1 (2012).