

HALDANE AT 125



J. B. S. Haldane and ЛЫСЕНКОВЩИНА (*Lysenkovschina*)

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The ‘Lysenko affair’

On 7 August 1948, at the end of a week-long session of the Lenin All-Union Academy of Agricultural Sciences in Moscow, Trofim D. Lysenko declared he had received the support of the Central Committee of the Communist Party of the Soviet Union for his biological theories. Lysenko’s beliefs about heredity and development, which he labelled ‘Michurinism’, consisted of a variety of ideas based upon his assumption that plants could adapt to survive in any climate, and be transformed into different species.¹ Lysenko claimed genetics was a ‘bourgeois’ science devised to promote racism and imperialism, and to prove the inherent inferiority of the working class. What followed was a purge of genetics across the USSR that soon spread throughout Soviet-allied states worldwide. When the nations subjected to Lysenko’s dictates finally emerged from the fog of Lysenkoism decades later what they encountered was a genetics that had to a certain extent been formulated in reaction to Lysenko’s opposition to the gene, and belief in the dominant role of the environment in evolution.²

Among the greatest difficulties in assessing J. B. S. Haldane’s response to Lysenko is the lack of the term ЛЫСЕНКОВЩИНА (*Lysenkovschina*) in English. In Haldane’s mother tongue the only word used is ‘Lysenkoism’. In Russian Lysenkoism refers exclusively to the content of what Lysenko claimed was true about nature—his theories. ‘Lysenkovschina’ is specific to the politics surrounding how his ideas were promoted up to Stalin, and later Khrushchev, through the web of personalities in between. It is impossible to understand Haldane’s position on Lysenkoism without first introducing the term Lysenkovschina in English, and I hereby do so.³

The derivation of Lysenkoism and Lysenkovschina underlines the cacophony of responses to the Lysenko controversy, and highlights the motivations of its participants. Regardless of what Lysenko said, his prescriptions for rescuing Soviet agriculture from a perpetual cycle of famine and want were inseparable in the West from the collective horror over the suffering of old friends and colleagues who were victims of these years.⁴

In his 1927 essay *Possible worlds*, Haldane said the ‘future will be queerer than we “can” suppose’.⁵ Thirty-six years later, in a self-taped obituary for the BBC, Haldane stated ‘In my opinion Lysenko is a very fine biologist and some of his ideas are right’.⁶ These two sentences, taken together, precisely articulate Haldane’s position on Lysenko. No one can predict where science is going and it is reasonable to believe that at least part of what anyone said will at some point in the future appear in the column labelled ‘right’. The complicated path between Haldane’s twin assertions has yet to be described.

Uffer and the Great War

John Scott Haldane, ‘Uffer’ within the family, trained ‘Jack’ to perform scientific experiments upon himself from the time he was an adolescent.⁷ Jack and Uffer collaborated in designing the gas mask used by British troops in the First World War, and reading Haldane’s letters home from the front we see how he was inspired to think intimately about the mathematics of natural selection.⁸ In a letter to his mother Maya, Haldane remarked that ‘much interest ... can be derived from discussing where the next shell will land, especially when the last two have landed just behind you and in front of you’.⁹ Haldane’s experiences also woke him to the horrors of industrialized warfare and

the dysfunction of a government intent on finding scapegoats for a disillusioning conflict that seemed to produce no winners.¹⁰

A simultaneous dispute between British geneticist William Bateson and T. H. Morgan and his students in the US, over whether genes are located on the chromosome, also shaped Haldane's views during these years. In 1914, Bateson, the editor of *Journal of Genetics*, the sole journal in the field, rejected a submission from Morgan's star, Alfred Sturtevant, stating, 'I myself consider the evidence against chromosome representations is gradually getting stronger but I am in no hurry to get into controversy on the subject'.¹¹ Bateson even went so far as to question the term 'genes' in Sturtevant's article, asking: 'Why "genes"? It merely looks barbarous and is impossible to pronounce. Already I here [sic] people saying eugenic.'¹²

Bateson's offhand reference to eugenics is an important point I will return to later. The more immediate issue was the fact that this rebuke inspired the 'Fly Room' to found their own journal, *Genetics*, in 1916.¹³ Meanwhile, Haldane published his first article, coauthored with his sister Naomi, in Bateson's *Journal of Genetics*.¹⁴ J. B. S. and Naomi's research not only took the important step of showing that what proved true in *Drosophila melanogaster* also worked with mammals, but Haldane also produced this work from the trenches at a time when the US had yet to even enter the War.¹⁵ These years also mark the point when the US replaced Britain at the forefront of genetics—a transition Haldane would not take lightly.¹⁶

Shearwater

After the war, Haldane became a member of a group American writer Gertrude Stein labelled '*une generation perdue*'—'a lost generation', unmoored from the roles and traditions that had guided behaviour earlier. Haldane's first stroke against the old order was a piece of dystopian science fiction, *Daedalus*—a bestseller which inspired Uffer's disapproval, but also gave Aldous Huxley the idea for *Brave new world*. As far as we know, Uffer was not upset by his son's equally shocking follow-up, *Callimicus*, a passionate defence of poison gas. The sum of Haldane's argument was that prejudice towards the use of chemicals in warfare was simply a fear of the new. Though in practice gas warfare lacked the pageantry of musketry or other types of combat, it was far more civilized and, conducted rationally, could prove far less deadly than the traditional method of 'push[ing] or throw[ing] pieces of metal at the enemy'.¹⁷

Aldous Huxley caricatured Haldane during these years in his novel *Antic hay*, a portrayal of life in post-War London composed of outcast intellectuals, artists, poets and scientists—one of whom was Haldane, going by the name

'Shearwater'. Shearwater is all intellect. When contemplating romance, Shearwater concludes: ' $x^2 - y^2 = (x+y)(x-y)$ and the equation holds good whatever the values of x and y. It's the same with your love business'

Shearwater plans experiments like placing human subjects in a heated chamber to perform strenuous tasks, testing the level of sodium in their perspiration, and seeing if this makes them prefer the taste of salt water. When departing a café, Shearwater is accosted by a young man who eagerly announces that he's proven that acquired characteristics are inherited by causing guinea pigs to go blind. 'Very remarkable', Shearwater responds. Other clues to Shearwater's unconventionality include a scene where he walks with a companion who is forced to adjust his pace and 'skip' 'out of step' to keep up. Shearwater is an oddity, a character, there is no one else like him.¹⁸

Although Shearwater is fiction, Huxley knew Haldane well, so we can presume there is a measure of truth—at least in terms of how Aldous, a friend since childhood, saw him. During these years Haldane also produced the first in a series of papers on the mathematics of evolution which were fundamental to taking the Fly Room outdoors, proving that *Drosophila* genetics could work in nature.¹⁹

It is at this time we see Haldane's burgeoning resentment towards the US, a newly recognized global power, as England saw its post-War fortunes decline.²⁰ Among the evidence is one of Haldane's first articles for a US popular magazine, 'Nationality and research', in *Forum*.²¹ Here Haldane presented his evaluation of what nations of the world contributed to science and used Morgan's lab as an example.

'Morgan's work on inheritances in New York is carried out upon a population of small flies larger than New York City', he wrote, and described the US as a place where endowments produced 'a colossal volume of scientific work of very unequal merit'. Not only that, but the methods are 'largely devised in Cambridge and London', and 'the interpretation often comes from England, Germany and Holland'. It is only in its ability to finance research that the US 'lead[s] the world'.

Haldane conceded that '[s]ome of the ablest men in Europe are constantly being attracted over by offers of salaries and still more by facilities for research'; however, he insisted that 'great men are more important to science than great laboratories'. Haldane concluded that '[t]he very wide diffusion of higher education in the United States is compensated for by its often indifferent quality and by the terrific obscurantism which makes biological teaching a farce in many parts of the country'.²² What the US had to offer science was wealth, and little more.

Meanwhile, Haldane continued to produce his papers covering the mathematics of population genetics and publishing popular essays in Britain, Europe and the US. The

capstone was his magnum opus, *Causes of evolution*, and with that he was off to his first appearance in the country he increasingly resented.

Eugenics, Lysenko and the Cold War

Just as 1915 was an important moment in the rivalry between US and British genetics, the summer of 1932 marks a point where we see a shift in the relationship between genetics and eugenics in the US. The latter had peaked in popularity and was on its way to decline for reasons perhaps best articulated in H. J. Muller's address, 'The dominance of economics over eugenics', at the Third International Congress of Eugenics—the last ever held.²³ In the months preceding the congress, Muller wrote to Haldane to ask for his support against Charles Davenport, who as congress organizer, was attempting to censor Muller's argument that eugenics in the US could never succeed due to capitalism: 'The "respectable" captain of industry, military leader or politician, and the successful gangster are psychologically not so far apart.' Muller cited Haldane as a source to argue that even if you sterilized 'genetic imbeciles' it would take several generations to see even minimal impact.²⁴

Haldane responded that a 'convinced socialist' would find Muller's argument 'rather modest'. He said, 'I am an unconvinced one (i.e. I vote socialist on probability)'. He also cited statistical data from a recent study by Hogben showing that 'environmental data account for at least half the variance in I.Q.'. Haldane said this proves capitalism is dysgenic 'not' because rich people are corrupt, but because wealthy people have fewer babies. Also, if black people really are inferior then the best way to limit their reproduction would be to make them wealthy.²⁵

When Haldane arrived in New York to attend the Sixth International Congress of Genetics, which began the day after the eugenics congress ended, he made a point of announcing his reasons for not attending the latter to local newspapers.²⁶ Haldane began by saying: 'I don't think I know enough to lay down the law for other people. It is not the scientific man's business to tell his fellow man what he should do. It will make him pretty unpopular if he does, and serve him right.'

Yet, for whatever reason, Muller still counted Haldane as an ally.²⁷ Three years later Haldane also disputed Davenport's eugenics, but his argument was based upon Davenport's insufficient knowledge of genetics, rather than any of the sociopolitical issues surrounding eugenics (see [Davenport 1930](#); [Haldane 1935](#)).²⁸ In his most extensive critique of eugenics, *Heredity and politics*, published on the eve of the Second World War, Haldane focussed on the US as the most disturbing example of where the trend had taken hold.²⁹

Muller continued to court Haldane during the difficult years that followed as he emigrated to the USSR and

presented Stalin with his eugenic plan, outlined in his manifesto, *Out of the night*.³⁰ Muller soon came into direct conflict with Lysenko, and in this case—given the choice between Muller's plan to breed an army of superhumans to conquer capitalism in the West, versus Lysenko's relatively useless panaceas for increasing agricultural productivity in the Soviet Union—we can conclude 'Lysenko was right', if only in the sense that he challenged Muller. It was only when Muller's misadventure ended in catastrophe that he turned on Haldane by instructing his good friend Julian Huxley—Aldous Huxley's brother—that Haldane 'must not be informed' of what had happened.³¹ The events Muller hoped to cover up included the arrest and execution of the two Russian geneticists, Isador Agol and Solomon Levit, he had known since he hosted them in his lab at the University of Texas several years earlier, as well as the fact that Lysenko's victory in his debate against Muller and Soviet geneticists meant the cancellation of the VII International Congress of Genetics, which was to have been held in Moscow.³²

At this point communications among the international community of geneticists became bogged down over the question of where to hold the next congress.³³ Once the War began Haldane began to participate in a series of experiments on submarine technology for the British Navy. Over the course of this work Haldane continued to follow Uffer's method by deliberately subjecting himself to oxygen deprivation and severe atmospheric pressures. His health would never recover.³⁴ Haldane also took the time, in his 1940 *Science in peace and war*, to note that Lysenko's 'attacks on the importance of chromosomes in heredity seem to me to be based on a misunderstanding', which 'would be very serious if he were dictator of Soviet genetics'.³⁵ In other words, science and politics should be kept separate. However, to a large extent Lysenko's influence on Soviet biology during the War remained obscure and the issue would not re-emerge until the fateful summer eight years later.³⁶

Haldane's role vis-à-vis these events began with his unwillingness to pan Lysenko's *Heredity and its variability*, after the English translation was published by Fly Room alumnus Theodosius Dobzhansky.³⁷ Meanwhile, Haldane was fielding numerous speaking invitations in Poland, Hungary and Czechoslovakia—while planning a sabbatical in Prague. He was granted his request for a leave-of-absence from University College London, and received approval from his Czech counterparts for a series of lectures he planned to deliver on eugenics and genetics.³⁸ And then, in the first week of August 1948, a 'discussion on the situation in biological science' took place in Moscow.

By this time Haldane was the subject of mockery as the US plunged deep into the Cold War. On his most recent visit he had generated headlines in *The New York Times* by insisting he would judge 'American civilization' based upon its ability to provide him size-18½-collar shirts, and irked fellow geneticists like Dobzhansky by speaking

at a communist rally at Madison Square Garden on the anniversary of Lenin's death.³⁹ *Time* magazine reported:

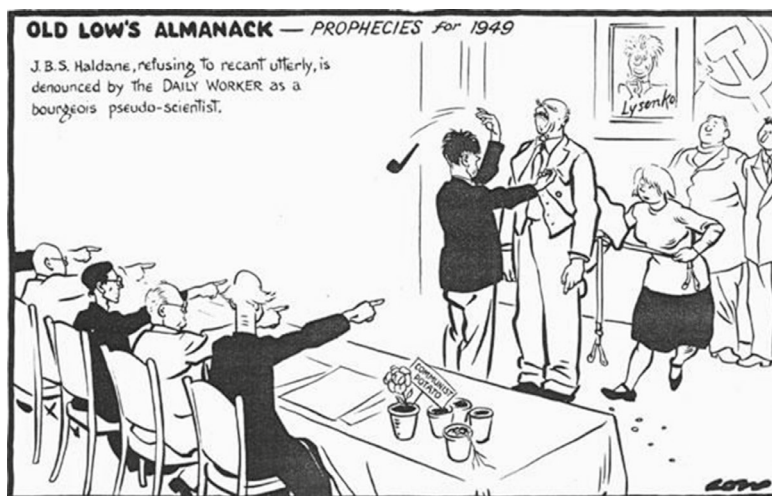
One of the biggest scientific fish in Communism's net, outside Russia, is British Biologist J. B. S. Haldane. Last week Haldane's scientific colleagues were watching closely to see if he would cling to the party line, recently clamped around some very dubious genetics (*Time*, Sept. 6). Most scientists suspected that Haldane would have to go back on either his Communism or his science.⁴⁰

Even after Lysenko's triumph, as late as mid-September 1948, Haldane planned to go forward with his plans to spend a sabbatical in Soviet-controlled Central Europe, declaring, 'I shall say just what I think in Prague, and if what I say does not agree with Lysenko, it's just too bad'. However, at some point between then and the end of December Haldane changed his mind. In an undated letter, Haldane regretfully wrote his Czech colleagues:

A most unfortunate thing has happened. During the war I broke my vertebral column at several points as a result of convulsions from breathing oxygen at high pressures. ... [T]he doctor in charge is taking rather drastic steps. He absolutely forbids me to travel until I am somewhat better, and will not promise when

land, C. D. Darlington and R. A. Fisher, were all critics of Lysenko, and therefore a conversation between them and Haldane could have proved illuminating. However, the event was a fiasco. Haldane commented: 'I find this discussion very odd for several reasons. The first is that I do not know what the other speakers have said.'⁴³ Indeed, not only were the debaters recorded separately—i.e. they never actually discussed anything—but Haldane's position was immediately caricatured by journalist John Langdon-Davies in his anti-Lysenko exposé, *Russia puts the clock back: Langdon-Davies versus Haldane*.⁴⁴

Leaving aside the obvious question of whether a journalist like Langdon-Davies was qualified to debate a geneticist on genetics, it is clear Haldane never stood a chance. Langdon-Davies referred to Russia as Haldane's 'spiritual home', and characterized his response to Lysenko as a 'schizoid solution' motivated by the 'internal conflicts twisting' his 'mind'.⁴⁵ Meanwhile, Haldane's continued efforts to learn more about Lysenko's actual experiments were stymied by the fact that their author refused to publish them in any way they could be verified. Haldane's efforts to hold the line on his doctrine that every scientific idea is worthy of consideration were getting him nowhere, and there is little doubt he sensed the role being written for him—a man trapped by the seeming contradiction between his scientific and political beliefs who was soon to be, as predicted by the cartoon below, attacked by all sides.⁴⁶



this will be. I am extremely sorry to disappoint you like this. But I should be worse than useless to you in my present condition....⁴¹

These were the circumstances in which Haldane participated in the 'debate' organized by the BBC on 30 December 1948.⁴² The other three participants, S. C. Har-

Of course, despite his excuse for not going to Prague, Haldane continued to go abroad for the rest of his life. However, his sudden decision not to 'teach genetics' 'in the homeland of Mendel' was followed by a steady distancing of himself from the socialist world in the years that followed.⁴⁷ Haldane published his last article for *The*

Daily Worker in 1950 and resigned from the British Communist Party. He went on to refuse invitations to events from numerous Russian and Soviet Bloc embassies and consulates in London, as well as an extended trip to the USSR. Meanwhile, his correspondence with the US—ranging from the group of students at the University of California at Berkeley who assumed he would be flattered that they had named their socialist organization in his honour, to the Chicago newspaper reporter who solicited his opinion for a book she was writing on evolution—evinced the extent to which his antipathy to the US, in conjunction with wariness of its global opponent, continued to deepen. To the latter correspondent he responded: ‘I shall be glad to answer your questions in return for a check for \$100 payable to the University College London. If I did not do so I should, to judge from the conduct of Americans in this continent, be regarded as a “sucker”.’⁴⁸

Conclusion

Though caustic, Haldane’s answer best sums up his response to Lysenko. He was not going to be anyone’s fool, and if the price of maintaining an open mind on a scientific issue while others closed theirs was humiliation, he would withdraw from the debate. There never was one. The fact that he also contextualized his response by referring to the ‘conduct of Americans’ speaks to the extent to which he felt debates on science had become fatally polarized by the Cold War. In this light it is also unsurprising that a few years later, as he boarded a plane at London airport bound for India where he would spend the rest of his career in voluntary exile, Haldane stated that he wanted ‘to live in a free country where there are no foreign troops all over the place; yes I do mean the Americans’.⁴⁹

Afterwards Haldane retreated into silence and watched Lysenko’s fate play out as he was brought down by the very political forces he had once enlisted to gain control. According to Zhores Medvedev’s *The rise and fall of T. D. Lysenko*, the decision of the Central Executive Committee of the Communist Party of the Soviet Union to remove Nikita Khrushchev from power was motivated to a significant extent by Khrushchev’s support for Lysenko.⁵⁰ Khrushchev fell and Lysenko went with him.⁵¹ It was Lysenkovschina, not Lysenkoism, that ultimately ruined Lysenko. Haldane was right.

Notes on sources

¹ The term ‘Michurinism’ referred to a hero of Soviet agriculture, I. V. Michurin (1855–1935), who was recognized as an important plant breeder by Soviet authorities. His closest analogue would be Luther Burbank in the US (1849–1946); however unlike Burbank, none of Michurin’s innovations are cultivated today.

² The duration and extent of Lysenko’s antigeneics campaign in the Communist Bloc varies widely. For various case studies see deJong-Lambert and Nikolai Krementsov (2012), as well as deJong-Lambert and Krementsov (2017).

³ The earliest use of ‘Lysenkoism’ in English dates from 1945, when it was invoked in a discussion about the autonomy of science after the Second World War—the moment when researchers in the US were waking up to the dangers and opportunities presented by the increased interest of the government in their work. The term Lysenkovschina was coined about a decade later in Russia as part of the first wave of criticism of Lysenko following the death of Stalin. The suffix ‘-schina’ is also attached to other names in Russia besides Lysenko’s. It denotes the politicization of an individual’s public image and ideas. It is also worth noting that though ‘Lysenkovschina’ appears in the Russian version of Wikipedia, ‘Lysenkoism’ does not. For a definition of the latter term one must consult a dictionary. See <https://ru.wikipedia.org/wiki/Лысенковщина>. The word is also spelled in English as ‘Lysenkovshchina’—however I have chosen the version without the ‘h’ between the ‘s’ and ‘c’ for the sake of simplicity and the fact that even Lysenko’s name is often pronounced quite differently depending upon who is talking about him.

⁴ The most prominent was Nikolai Vavilov (1887–1943), whom Haldane met when he visited the USSR in 1932 (for details of the visit see Charlotte Haldane’s *Truth will out* (Haldane 1950, pp. 41–42)). For a comprehensive list of the scientists and politicians who were victims of this period, see Joravsky (1970, pp. 317–335); for an account of the history of famine in Russia, with an emphasis on the Soviet period, see the following description and list of sources published by Mark Tauger: <https://www.newcoldwar.org/archive-of-writings-of-professor-mark-tauger-on-the-famine-scourges-of-the-early-years-of-the-soviet-union/>.

⁵ It is worth noting that this essay was left out of the edition of *Possible worlds* published in the US.

⁶ ‘J.B.S. Haldane’s self-obituary,’ *The Listener*, 10 December 1964, pp. 934–935.

⁷ For example, see Louisa Kathleen Haldane’s memoirs (Haldane 1961, p. 176). Ronald Clark’s biography of JBS (Clark 1969) also contains numerous anecdotes; however, the book lacks footnotes.

⁸ For descriptions of these experiments see Naomi Mitchison (Mitchison 1988, p. 112) and JBS’s *Callinicus* (Haldane 1925, p. 69).

⁹ J. B. S. Haldane to Maya (Louisa Kathleen Haldane), 29 March 1915 (MS-374-12. Mf. Sec. MSS. 2103. MS. 20665. Haldane Papers, National Library of Scotland).

¹⁰ According to Haldane’s sister Naomi Mitchison, the family was never thanked for their work on the gas mask due to a political scandal involving their uncle, Richard Haldane, who was blamed for having been naïve about Germany’s preparations for war when he served as British War Minister from 1905 to 1912. See Mitchison’s *All change here* (Mitchison 1988, pp. 112–113), as well as numerous references to Lord Haldane in *The Times* of London, from January 1915 through December 1918.

¹¹ Cock and Forsdyke (2008).

¹² Cock and Forsdyke (2008, p. 289).

¹³ Cock and Forsdyke (2008, p. 376).

¹⁴ Haldane *et al.* (1915).

¹⁵ Cock and Forsdyke (2008, pp. 337–338). Correspondence: Naomi Mitchison to J. B. S. Haldane, Thursday the 23rd

- [1915?] (J. B. S. Haldane Papers, National Library of Scotland); J. B. S. Haldane to Naomi Haldane, undated (Acc. 1075 3/1, Haldane Papers, National Library of Scotland); Naomi Mitchison Correspondence, 1915–1917, 1967–1970 (Haldane Papers, National Library of Scotland). It is ironic that Bateson accepted their paper given that its significance was showing genetic linkage, which was the precise reason he had rejected Sturtevant's paper the year before.
- 16 Correspondence, J. B. S. Haldane to Naomi Mitchison, 31 March 1915 (MS-374-12. Mf. Sec. MSS. 2103. MS. 20665. Haldane Papers National Library of Scotland).
 - 17 *Callinicus* (Haldane 1925, pp. 5–6).
 - 18 Aldous Huxley's *Antic hay* (Huxley 1997, pp. 55, 58, 60 and 94); the first edition was published in 1923, the same year Haldane published *Daedalus*.
 - 19 See bibliography items 1924a, 1924b, 1925d, 1926a, 1927a, 1927b, 1931a, 1931b, 1932c. in Pirie (1966). For the connection between Haldane's work and Drosophila genetics, see, among other primary sources: Dobzhansky (1937, pp. 124, 174, 176, 177 and 252) (the number of references to Haldane is particularly notable in light of the fact that Dobzhansky was much more attracted to Sewall Wright's mathematics of population genetics than he was to Haldane's or Ronald Fisher's); Lewontin *et al.* (2003, pp. 56–63).
 - 20 Another very early example of Haldane's antipathy towards the US is an undated letter sent to his sister Naomi between 1916 and 1928, where he congratulated her on being published in the US by saying: 'I am glad you are being translated into American. I don't remember anything worse than TONGUES.' (Acc. 9186/2, Naomi Mitchison Correspondence, 1916–1928, n.d. Haldane Papers, National Library of Scotland).
 - 21 It is not only ironic that Haldane used his first opportunity to publish popular articles in the US to insult the US, but then he also ignored his deal with *Forum* to give them first option on his work (Correspondence, Managing Editor to Mrs C. Burghes, 25 January 1926. MS-374-12. Mf. Sec. MSS. 2103. Ms. 20665. National Library of Scotland).
 - 22 Haldane (1926).
 - 23 See chapter VII in Kevles (1985), as well as Carlson (2001, pp. 260–261).
 - 24 Muller (1932, see pages 40 and 45).
 - 25 See Carlson (1981). Correspondence, J. B. S. Haldane, 29 July 1932 (Haldane 1932–1964. Muller MSS. Series I Box 21, Lilly Library, Indiana University).
 - 26 'Dr. Haldane on Eugenics', *New York Herald Tribune*, 23 August 1932.
 - 27 American Museum of Natural History Library Central Archives, Box 737, Folder 'International Congress of Genetics 1932', 1267. Muller's behaviour towards Haldane at this point was most likely due to the fact that he thought, because they were both socialists, they had much more in common than they did. Another factor is that Muller had so few allies at this point due to his reputation for alienating people by accusing them of taking credit for his work. See Carlson (1981) as well as comprehensive histories of the Fly Room such as Kohler (1994) and Allen (1978).
 - 28 See Davenport (1930) and Haldane (1935).
 - 29 Haldane (1938); Haldane specifically addresses his doubts on Muller's eugenics on p. 133. Another good source covering Haldane's views on eugenics is Haldane (1932).
 - 30 Evidence that Muller considered the USSR his new home and did not plan on returning as a citizen to the US includes trivial details such as that he let his auto insurance as well as his membership in the American Society of Zoologists expire, to broader evidence such as that the reason he never joined the Communist Party in the US was because he believed it would hurt his chances of being able to resettle in the Soviet Union. Also, in the letter Muller wrote to Stalin hoping to sell him on his eugenics plan, as outlined in *Out of the night* (Muller 1935), he predicted that the army that would be bred as a result could easily conquer capitalism. See Correspondence, The Robbins Company to Mr Muller, 17 February 1934 (Muller Correspondence, 1933–1934. Muller MSS. Series I Box 1, LMC1899, Lilly Library, Indiana University). Correspondence, H. B. Goodrich to Dr Muller, 9 January 1935; correspondence, Carlos Offermann to Elof Axel Carlson, undated (Hermann J. Muller Papers. Cold Spring Harbor Laboratory Archives). For Muller's letter to Stalin see Subseries: Writings by Muller (Box I. Muller Papers, Lilly Library, Indiana University).
 - 31 Correspondence, H. J. Muller to Julian Huxley, 9 March 1937 (Huxley, J. S. 1933–1937. Muller MSS. Series I, Box 23. Lilly Library, Indiana University); see also deJong-Lambert (2013).
 - 32 See deJong-Lambert (2017).
 - 33 Krementsov (2004); Soyfer (2003).
 - 34 The notes on these experiments can be found in the J. B. S. Haldane papers at the National Library of Scotland. Among the best examples of what Haldane subjected himself to can be found in MS20566-73, 'Third trial of proposed helium-breathing apparatus' (J. B. S. Haldane Papers. National Library of Scotland). For accounts of the effect of these experiments upon Haldane's health see Montagu (1970, pp. 234–238) and Sheridan (1986, p. 87).
 - 35 Haldane (1940, p. 83).
 - 36 Lysenko's wartime activities remain a relatively understudied topic. One recent investigation is Hirofumi Saito, 'T. D. Lysenko and VASKhNIL during wartime: The "Pre"-History of the August Session of 1948' (unpublished presentation, 7th International Conference of the European Society for the History of Science, 24 September 2016). Saito's account challenges the idea that Lysenko's agricultural proposals were widely adopted and proved useful during this period, as well as that this success was a factor in his assuming the presidency of VASKhNIL after the war. For an example of the type of account Saito is opposing, see P. F. Kononov (2010) *Вклад Т.Д. Лысенко в победу в Великой Отечественной войне* (Москва: Самообразование, 2010).
 - 37 Lysenko (1946); J. B. S. Haldane to H. J. Muller, 15 May 1946 (Haldane 1932–1964. Muller MSS. Series I Box 21, Lilly Library, Indiana University); H. J. Muller to Milislav Demerec, 5 June 1946 (Milislav Demerec Papers, The American Philosophical Society).
 - 38 The letters outlining these arrangements can be found in exchanges between Haldane and Dr Komarek, Dr A. Hoffmeister, B. Fogarasi, Dr E. Weil and Mr Ferencz, dating between 23 January 1947 and 29 July 1948 (MS20535 (132–139), MS20534 (181a–191), MS20534 (202–211), MS20535 (22–30b), MS20535 (40–47), MS20535 (48–55), MS20535 (56–64), MS20535 (83–92), J. B. S. Haldane Papers, National Library of Scotland). The letter where Haldane cancelled his trip is undated, but given the order of the letters must have been sent after the VASKhNIL conference.
 - 39 Correspondence, Theodosius Dobzhansky to L. C. Dunn, 8 January 1947 (The American Philosophical Society); cor-

- respondence, Theodosius Dobzhansky to L. C. Dunn, 23 January 1947 (The American Philosophical Society).
- ⁴⁰ ‘Scientists Choice’, *Time*, 27 September 1948.
- ⁴¹ Correspondence, J. B. S. Haldane to Dr Komarek, undated (MS20535 (132–139), J. B. S. Haldane Papers, National Library of Scotland).
- ⁴² H. J. Muller to Milislav Demerec, 5 June 1946 (Milislav Demerec Papers, The American Philosophical Society).
- ⁴³ ‘The Lysenko Controversy’, *The Listener*, 9 December 1948, p. 875; Naomi as well as was bothered by the fact that what was advertised as a debate actually consisted of four geneticists separately recording their opinions for live broadcast, rather than an actual conversation between them. As she wrote to her brother the next day, ‘The broadcast last night was very interesting though it would have been much more worthwhile if you could all have seen one another’s scripts’ (Naomi Mitchison to J. B. S. Haldane, undated. Haldane Box 15 (b). Lysenko Controversy, 1947–1950. J. B. S. Haldane Papers, University College London).
- ⁴⁴ Langdon-Davies (1949). Langdon-Davies’ claim—that the reason Darlington, Fisher and Harland had been recorded separately was because, ‘[t]he BBC took special precautions against possible murder by having each of the four conspirators record contributions under circumstances which insured against their meeting on the stairs’—speaks for itself (Langdon-Davies 1949, p. 78). It is also notable that both Langdon-Davies and Muller are accused of politicizing biological science during this period by those who seek to restore Lysenko’s reputation in Russia today. See Лев Живосткий, *Неизвестный Лысенко* (Москва: КМК, 2014), с 80–81.
- ⁴⁵ Langdon-Davies (1949, pp. 155, 12–13).
- ⁴⁶ David Low, *The Evening Standard*, c. 1949. *The Daily Worker* was published by the British Communist Party and Haldane was a regular contributor between 1937 and 1950. The same month as the BBC debate Haldane also published a letter in *The Hindu* defending himself against the accusation that he was unable to express his true thoughts on Lysenko because no ‘progressive paper’ would publish them. Once Langdon-Davies’s *Russia puts the clock back* came out Haldane again published a letter in *The Hindu* where he stated that he had ‘seldom read a book containing more demonstrably untrue statements in so short a space’. See ‘Lysenko and Darwin’, *The Hindu*, 19 December 1948 and ‘Nonsense About Lysenko’, *The Hindu*, 20 November 1949; thanks to Veena Rao for bringing both these articles to my attention. For a different perspective, both on Haldane’s attitude in the matter of Lysenko and on the BBC radio ‘debate’ alluded to earlier, see the accompanying article by Charlesworth (2017).
- ⁴⁷ Correspondence, Judith Todd to J. B. S. Haldane, 30 May 1951 (Haldane Box 34. 4 (1946–1951). J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to Judith Todd, 1 June 1951 (Haldane Box 34. 4 (1946–1951). J. B. S. Haldane Papers, University College London); correspondence, Dr Barnett Stross to J. B. S. Haldane, 26 March 1952 (Haldane Box 21. General correspondence, 1951–1952. J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to Dr Barnett Stross, 27 March 1952 (Haldane Box 21. General Correspondence, 1951–1952. J. B. S. Haldane Papers, University College London); correspondence, Stephen Joley to J. B. S. Haldane, 22 May 1952 (Haldane Box 21. General correspondence, 1951–1952. J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to Stephen Joley, 4 June 1952 (Haldane Box 21. General correspondence, 1951–1952. J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to the Private Secretary, The Embassy of the Union of Soviet Socialist Republics, undated (Haldane Box 21. General Correspondence, 1951–1952. J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to the Private Secretary, 1 October 1952 (Haldane Box 21. General correspondence, 1951–1952. J. B. S. Haldane Papers, University College London). An extremely insightful account of the difficulty of Haldane’s position during these years can be found in an interview with John Maynard Smith; see <http://www.webofstories.com/play/john.maynard.smith/33>; thanks very much to Vidyanand Nanjundiah for making me aware of this reference.
- ⁴⁸ Correspondence, Francis Harwain to J. B. S. Haldane, 24 December 1947 (Haldane Box 34. 4 (1946–1951). J. B. S. Haldane Papers, University College London); correspondence, J. B. S. Haldane to Ruth Moore, 18 March 1952 (Haldane Box 21. General Correspondence, 1951–1952. J. B. S. Haldane Papers, University College London).
- ⁴⁹ ‘Haldane, Geneticist, Quits Britain for India Which Has No G.I.’s’, *The New York Times*, 25 July 1957.
- ⁵⁰ Medvedev (1969, p. 225).
- ⁵¹ The exact ‘crime’ Lysenko was ultimately accused of was misrepresenting butterfat yields among his cows at his experimental station in the Lenin Hills outside Moscow. In context with the larger consequences of Lysenko’s career, his denouement was trivial.

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