



## J. B. S. Haldane's passage to India: reconfiguring science

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**Abstract.** In 1957, John Burdon Sanderson (JBS) Haldane (1892–1964), the world's leading population geneticist, committed political radical and one of the three 'founders' of neo-Darwinian 'Modern Synthesis' of twentieth century biology (Sarkar 1995; Haldane 1932; Cain 2009; Smocovitis 1996), ostentatiously renounced both his British citizenship and his prestigious chair at University College London. In a decisively and very public anti-imperial gesture, ostensibly played out as a reaction to the Suez crisis (although his discontent was simmering for quite some time), Haldane, and his partner, geneticist Helen Spurway (1917–1977), turned their backs on Britain and set off to India to offer their considerable scientific prestige, their inexhaustible organisational abilities, along with their leading *Journal of Genetics*, behind the efforts to build a 'modern', democratic India emerging out of the ashes of colonial rule. Haldane's support of independent India was a major triumph for the new state, itself in the midst of negotiating a fine balance between rapid modernization through science and technology and an postcolonial respect for traditional 'non-Western' values. Although his time in India was short, Haldane's few years in India were marked by a frenzied engagement with the new India, its science, its government and its culture (Rao 2013).

**Keywords.** Haldane; statistics; variation; postcolonial knowledge; Mahalanobis.

### Introduction: the reconfiguration of J. B. S. Haldane

In 1957, John Burdon Sanderson Haldane (1892–1964), the world's leading population geneticist, committed political radical, and one of the three 'founders' of neo-Darwinian 'Modern synthesis' of twentieth-century biology (Fisher 1930; Haldane 1932; Dobzhansky 1937; Sarkar 1995; Smocovitis 1996; Cain 2009), ostentatiously renounced both his British citizenship and his prestigious chair at University College London.<sup>1</sup> In a decisively and very public anti-imperial gesture, ostensibly played out as a reaction to the Suez crisis (although his discontent was simmering for quite some time), Haldane, and his partner, geneticist Helen Spurway (1917–1977), turned their backs on Britain and set off to India to offer their considerable scientific prestige, their inexhaustible organizational abilities, along with their leading *Journal of Genetics*, behind the efforts to build a 'modern', democratic India emerging out of the ashes of colonial rule.<sup>2</sup> Haldane's support of independent India was a major triumph for the new state, itself in the midst of negotiating a fine balance between rapid modernization through science and technology and a postcolonial respect for traditional 'non-Western' values. Although his time in India was short, Haldane's few years

in India were marked by a frenzied engagement with the new India, its science, its government and its culture (Rao 2013).

Haldane's passage to India has been an object of study earlier. The key works include the highly detailed and lively biography by Ronald Clark in the 1960s (Clark 1968 and 1984),<sup>3</sup> the loving memoirs by his former students and colleagues (esp. Dronamraju 1968, 1985, 1987, 2009, 2010, 2012, 2016), and those numerous and detailed accounts describing this great scientist's influence on science in India (e.g. Rao 2013).

Strikingly, however, the closer we look the more we see that Haldane's scientific passage moved in more than one direction. And it is this aspect of Haldane's passage to India that has been so little studied in any detail.<sup>4</sup> Renowned for his staunch and aggressive reductionism, his commitment to clear and specific criteria for 'fitness' and rigid classificatory hierarchies, Haldane metamorphosed in India, reconstituted through contacts with the 'local' forms of knowledge, institutions and methods of science in the 'East'. Using his base in India, Haldane worked this new 'local' knowledge back into the global, offering up a potential rethinking of biology, of Darwinism, the 'modern synthesis' and the very methodologies of science

itself. Haldane's metamorphosis in India offers one strong challenge to the usual 'centre-periphery' model of scientific development and knowledge transfer (Abraham and Paula 2006; Elshakry 2010). It speaks to issues of local knowledge and its participation in the making of modern science. This paper is about that encounter, the movement and metamorphosis of knowledge, and the engagement of local knowledge and its influence on global science, while recognizing its significance for biology, knowledge transfer, and the political place of modern science.

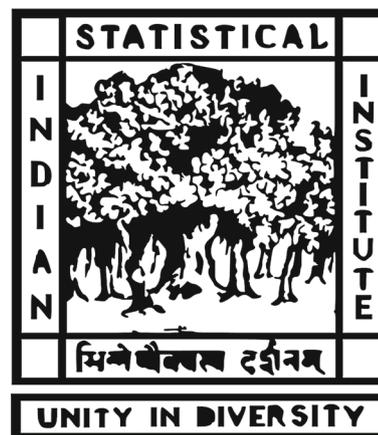
### Haldane's passage to India

The reasons for Haldane's move to India were multifaceted and deeply coloured by Haldane's passionate, albeit sometimes rather extreme, commitments, especially his enthusiasm for taking the most radical position possible. His resignation from UCL and subsequent renunciation of his British citizenship were but moments in a highly turbulent and deeply engaged life.<sup>5</sup> Haldane could lurch from a staunch, 'manly' defence of gas warfare in WWI (Haldane 1925), through mitigated support and then critique of eugenics (Haldane 1932; Mazumdar 1991), to radical Marxism in the 1930s (Haldane 1939),<sup>6</sup> and then, in his last years, by going native and 'homespun' in India. His own very early turn to the problems of population biology may have been part of his vociferous attacks on religion and the continuing, albeit premature, claims about the 'Death of Darwinism' in the first decades of the twentieth century (McQuat and Winsor 1996; Bowler 2001). As Chair of the Editorial Board of the Communist Party of Great Britain's *Daily Worker* (from 1940 until the Board was dissolved in 1950), and its regular science columnist, Haldane had shown a particular flair for bringing science, often radical science, to the people (Pirie 1966, p. 222). He began his popularization of science before his membership in the Party and continued to do so in his Indian years. But he could preserve a stinging independence with respect to his chosen political affiliations, including that of his own Party. He gingerly negotiated his way through the Lysenko crisis in the 1940s and 1950s, refusing to publically denounce Lysenko, but all the while noting the unsupportable nature of most of Lysenko's revitalized neo-Lamarckism and the ill effects caused by Stalin's political interference (Paul 1983). By the 1950s Haldane was already growing distant from the Party, as he would explain in a draft resignation letter, for both personal (related to financial advice) and certainly for political reasons. Although he would never sever his links, throughout the 1950s his support for the Party continued to hang by a thread. He was looking elsewhere for a political anchor.

Haldane's affair with India started as early as 1918 when he was convalescing in Simla after a war injury. Later he would find himself among those many enthusiastic statistical pilgrims and scientific planners making the journey in the 1940s and 1950s—pilgrims that included heavyweights

such as R. A. Fisher, Norbert Wiener, and many others. Haldane was already accepting invitations for lecture tours as early as the eve of independence, and featured as the keynote speaker at the Indian Science Congress in 1952.<sup>7</sup> The Suez Crisis of 1957 provided a perfect opportunity and a ringing catalyst to announce his move (Rao 2015).

Significantly, in negotiating his passage to India, Haldane first found a welcome home at the Indian Statistical Institute (ISI) of Calcutta (now Kolkata). Established in 1931 under late colonialism by the renowned Indian statistician Prasanta C. Mahalanobis (1893–1972) as a stronghold of so-called *Bhadralok* independence-oriented science of Bengali elite (Raina and Habib 1995; Rudra 1996; Bhattacharya 2007), the ISI was deeply engaged in the rebuilding of independent India and its new constitution, offering up resources, models and evidence for reworking the new, modern, liberated state. The ISI's focussing of statistics on 'governability' and democracy was remarkable, and perhaps unprecedented in any research institution—the first of its kind in the world.<sup>8</sup> Its vision of the new state is perfectly captured in the ISI slogan: भिन्नेष्वैक्यस्य दर्शनम् 'Seeing unity in diversity'.



Although certainly well grounded by 1947, following independence the ISI was to become one of the key players in the governing Congress Party's uneasy compromise between 'homespun' Gandhian visions and Nehru's 'modernization' (Weiner 1967; Rudolph and Susanne 1987; Prakash 1999; Zachariah 2005; Arnold 2013), providing foundation for the latter's view that a contemporary state and democratic life must be grounded in modern statistics, biology and governability, a new form of what social theorist Michel Foucault and his followers have called 'biopolitics' (i.e. the late-modern explosion of numerous and diverse techniques for measuring and engaging the lives of 'populations' and 'bodies' in governance and civil society) (Porter 1996; Rose 1999; Foucault 2003, 2009, 2010). ISI Director Mahalanobis himself was the key architect of the second, and decisive, five-year plan of the new State. It was in that biopolitical, statistical landscape that Haldane and Spurway landed in 1957.

## The statistical landscape of the new India

It should be noted that statistics in India was not merely a (re)application of the technologies of probabilities onto the Indian landscape (Ghosh 1994; Ghosh *et al.* 1999, 2010). The Raj certainly visited number upon the Indian landscape in its large-scale efforts to integrate India into the empire (Kumar 1995; Barber 1998; Arnold 2000; McLeod 2000; Harrison 2005; Endersby 2008). But it also spawned an indigenous interest in the field, and the possibility of using numbers for liberation rather than colonial control. Haldane's arrival at the ISI overlapped with just such a move: ISI Director Mahalanobis's project to delineate radically new and subsequently highly influential sampling techniques designed to take into account the diverse state of the Indian society and the political contingencies of a newly liberated and developing economy (Mahalanobis 1927, 1936, 1944). Trained in the best schools in India and King's College, Cambridge, yet wholly dedicated to an independent India, Mahalanobis's own work showed a striking reworking of the biopolitical project and the meaning of modern statistics in a decidedly post-independence context.

Mahalanobis is best known for two major innovations in statistics—the Mahalanobis distance function, which measured the relationship between a point and a distribution (Mahalanobis 1936; Dasgupta 1993), and the methodologies of large-scale sample surveys (Mahalanobis 1944, 1946, 1961)—both of which took very seriously the vast diversity of local populations in the task of measuring it. Diversity and probability also engaged Mahalanobis when he turned to Indian logic and the *Jaina* school (Mahalanobis 1954), finding there a useful resource for understanding multivalued diversity within an indeterminate universe.<sup>9</sup>

## Haldane's postcolonial science: diversity and unity

Mahalanobis certainly recognized Haldane as an anti-imperialist fellow traveller, a politically committed biologist, statistician and organizer dedicated to a modernized Indian independence, and a philosophically perceptive thinker (Sarkar 1994; Adams 2000). Capping Mahalanobis's considerable coup in attracting Haldane to India, Haldane brought along with him the *Journal of Genetics*, established in 1910 by the British geneticists William Bateson and Reginald Punnett and one of the oldest and most influential of journals in genetics—a significant transference of scientific prestige.<sup>10</sup>

On first gloss, Haldane's science traced the usual 'dissemination' route—migrating from the 'centre' to the so-called 'periphery', albeit carrying with it a deep radical tinge. However, Haldane's science was also 'drawn' to India, attracted to the indigenous desire for a governable science based on notions of 'diversity' (Haldane

1959a,b,c,d,e, 1965). The natural history and diversity of India was indeed a stated draw. And this encounter was soon to have a severe impact on the very 'content' of his thought.

In the few years he spent at the ISI, and in his subsequent short period in his own research institute in Bhubaneswar, Haldane mentored a new generation of young Indian scientists, pioneers in pure and applied sciences of statistics, evolution and experimental biology. At the same time he found himself being elevated to 'hero' of the new independent India. His period at the ISI, we should not be surprised, was not a smooth one and was as equally fraught as any of his dealings with British institutions and authorities.<sup>11</sup> Conflict with the Director concerning such trivial issues such as decorum quickly eased over into issues of class and status, and the knotted intricacies of Indian administrative protocol. These, in turn, grew into debates about the very future of Indian science. Conflicts with the Director soon forced Haldane to resign from the ISI and, after a short engagement with the Council of Scientific and Industrial Research (CSIR), Haldane moved to Bhubaneswar in the state of Orissa, where the progressivist Chief Minister offered to build him an institute of genetics and biometry (Rao 2013).<sup>12</sup> But most interestingly, it is at the ISI and in Bhubaneswar that Haldane encountered these new, local, techniques of large-scale sampling, visualizing statistics, and approaches to logic and natural history, nurtured by the local researchers and by the Director, Mahalanobis, and originally developed to leaven with numbers the politics of a new, highly diverse, multiethnic, multicaste society of the size and diversity of India. Haldane wanted to get away from pure theorizing—to witness and participate in the agricultural reform and vast engagement with the fecund natural history of India. And on this landscape we witness the metamorphosis of Haldane, delivering new visions of the nature of science, its structure and meaning, and especially the relationship between European science and local science.

## Indian philosophy

Haldane had already re-examined his biology and science in light of a radical materialist philosophy—in the case of his encounter with Marxism in the 1930s and 1940s (Haldane 1939). There he reimagined Darwinian development as an instance of process through contradiction, emphasizing the notion of impermanence in nature, and the relationship between theory and practice. Now he was to reimagine biology in light of his new engagement with Indian philosophy, science and ethics. In light of that encounter, Haldane would come to radically revise his deeply held and quite influential views on a variety of topics: on the mathematics of biology, the role of natural selection, the irreducible importance of variation, and even on such related topics as vivisection, human

experimentation, sociobiology, and statistics. In this section we will examine his metamorphosis. We will examine three points in particular, admitting that Haldane's metamorphosis was multifactorial, contradictory and certainly provisional. We will focus on his new encounters, following Mahalanobis, with Indian logic and styles of reasonings, and Mahalanobis's new sampling techniques, and especially with the inexorable presence of diversity and variety. Each pressed deeply upon Haldane's received science, and each had significant consequences for the way that Haldane visioned the science of biology.

### From beanbags to rice pads

Notoriously, upon arriving in India Haldane's scientific baggage was bulging with his unflinching, vociferous, almost violent, support for what has been called 'reductionist' genetics (Haldane 1932; Sarkar 1998). In the West, Haldane's style of self-described 'beanbag' genetics precipitated reactions from field naturalists and evolutionists taking their lead from the indefatigable Ernst Mayr of Harvard. For Haldane, biology must go mathematical. In his opponent's view, he had gone too far in founding biology on factorization and frequency of distribution of fundamentally independent units, the 'genes' (Mayr 1942; Haldane 1964; Dronamraju 2011; Rao and Nanjundiah 2011; cf. Sarkar 2016). In a series of articles and his book of 1963, Mayr resisted the beanbaggers by pointing to the relational and multiple genetic contexts of selection, polypoidy, polygenetic effects, etc. (see Mayr 1963, chapter 10). Strikingly, though, Haldane's last defence of traditional beanbag genetics occurred at the end of his Indian period, exactly the years in which he was beginning to question certain foundations of biology and its very methodological grounding in received Western thought. Haldane's 'An Indian perspective on Darwin' (Haldane 1959a) and his Sardar Vallabhbhai Patel lectures on 'The unity and diversity of life' delivered for All India Radio in 1957 offer clues to his changing perspective (Haldane 1957a).

Explicitly challenging the Eurocentric way of seeing biology and science, and especially the role of 'natural selection' and the focus on Linnaean hierarchies of classification via 'essences' (cf. McOuat 2009; Ereshefsky 2010), Haldane's later work marked an important, albeit little-studied, revision of his cherished beanbag science. Although never abandoning the necessity of thinking in 'beanbags' Haldane's acceptance of a fundamental 'essence' linked to genes, and formulated into the mathematics of population genetics, evolved from essentialism and adaptationism towards a view more attuned to the diversity and on-the-ground fieldwork found in Indian biology, and more sensitive to indigenous styles of reasoning. His mathematical biology was revealing signs of change and a sensitivity for irreducible variety found in the biological and political landscape of a postcolonial

India—simply, Haldane's science was 'going native', calling out for a crucial revision of neo-Darwinism, statistics, and even received notions of logic (Zimmerman 1996; Sarukkai 2005).

Significantly, while at ISI, Haldane immersed himself in the deep study of Indian logic and philosophical systems (Haldane 1957b), nurtured by Mahalanobis's own explorations in Indian styles of logic and its contributions to statistics (Mahalanobis 1954). Haldane quickly absorbed his mentor's engagement with philosophy and logic and expanded on Mahalanobis's lead, displaying his prowess at taking *Jaina* logic to show how probabilistic judgment flows directly from the simplest of causes. Haldane drew on his earlier experiments in perception to show that the *Jaina* category of *avakta* produces exactly the kind of probability function available to modern statistics. Like Mahalanobis, he was careful to recognize the danger of 'presentism'—i.e. one should not rationally reconstruct *Jaina* logic to fit a modern theory of probability. Rather, Haldane recognised the 'parallel' between *Jaina* logic and modern probability, although achieved by different methods: the Jainan by meditation, Haldane's by 'concrete experiment on animals'.

In his Sardar Vallabhbhai Patel lectures on 'The unity and diversity of life' presented on All India Radio in 1957 and printed in 1958, Haldane expressly reintroduces the central biopolitical slogan of his host institution ISI—'unity through diversity' (Haldane 1958). (The outline of the radio talk was already discussed at great length with Mahalanobis.<sup>13</sup>) He begins his radio talk with an explanation of different forms of Indian logic, and their applicability to modern conceptions of science and life—'Both the Buddhist and *Advaita darśanas* have argued that *ahamkāra* is illusory' (Haldane 1958). Instead, we now see an emphasis on diversity—a diversity that is hard to capture in the kind of essentialist logic and science in the West. The mode of the presentation is folksy, in the tradition of his submissions to *The Daily Worker* in the 1940s, but now turned to local considerations: 'A cow is a cooperative commonwealth as regards the digestion of grass, but an individual as regards the production of milk' (Haldane 1958). But the tone is serious. While diversity is the ground of all being, there is a unity that has been missed: the unity of life. 'Indian scholars have insisted on the kinship between men and animals, and on the presence of mind at least in some animals.'

Haldane's one last, radical postcolonial 'synthesis' would now emphasise 'variation' and 'diversity' over 'selection', 'inheritance', and unilinear trees of descent.<sup>14</sup> The consequences were enormous. Clearly, Haldane was evolving towards what philosophers of biology have now recognized as a 'pluralistic', nonreductionist account of biology and science (Dupré 1995; Gould 2002; Longino 2002; Longino and Waters 2006). Haldane would outline this emerging critique of modern conceptions of biology and evolution in a short, thought-filled paper solicited for

the special 1959 issue of *The Centennial Review of Arts and Science*, published from Michigan (Haldane 1959a). Note the title: 'An Indian perspective of Darwin'. Haldane was now identifying himself as Indian: 'I could not have written this article before I became an Indian'.

Darwin, says Haldane, is rightly recognized as an event in the development of Western thought because he convinced us of the 'fact' of evolution, and that we descend from animals. But the Hindus, Buddhist and Jainans of India and China needed no such convincing. Rather, Darwin's real contribution to biology, said Haldane, was not natural selection and survival of the fittest (which are predominantly Western prejudices tied to colonialism and domination), but rather Darwin's meticulous study of the irreducible variety found in the world. Haldane points to the first, and often forgotten, two chapters of *On the origin of species*—'Variation under domestication' and 'Variation under nature'. Starting here is key. Simply, Darwin turned our vision to the 'wonderful' nature of irreducible variety. Western philosophy, on the contrary, looks for essences and is less interested in 'the details of natural objects' (Haldane 1959a). Darwin, especially in the last chapter of the *Origin*, 'foreshadows a logic based on differences' and points towards a whole branch of statistics based on 'random sampling'. All sciences must go statistical in the way of the indeterminants of Gassett, Pearson and Mahalanobis. Nature is statistical. Natural selection itself is but a form of the sampling, not unlike the new sampling techniques developed on the Indian landscape (Haldane 1959a). Darwin had an Indian perspective.

Other aspects of Haldane's thought found themselves realigned. His shocking and idiosyncratic advocacy of 'self-experimentation'—'being one's own rabbit'—, so characteristic of his youthful masculinist heroism and his phenomenological commitment to 'subjective' experience (Haldane 1927), would now metamorphose into an ethics of unity intertwined with what he would now claim as a new, 'Indian', ethics of 'no-harm' (Haldane 1959d,e).<sup>15</sup> The shift in emphasis is marked. Even Haldane's uneasy support for 'eugenics' now reworked itself in the face of overwhelming local diversity (Haldane 1957c).<sup>16</sup> He would no longer speak of the 'inequality of man' (Haldane 1932) as the ground for making eugenic inferences from population genetics. Rather, 'diversity' was to be encouraged as the basis of a new, postcolonial, liberal democracy (Muzumdar 1992). His breathless and sometimes fearful 'futurism' of his early 'scientific' utopia, *Daedalus* (Haldane 1924), now went 'homespun': 'I also happen to be proud of being a citizen of India, which is a lot more diverse than Europe, let alone the U.S.A., the U.S.S.R or China, and thus a better model for a possible world organisation' (Haldane to Geoff Conklin, 5 June 1962, as quoted by Guha 2008, pp. 769–770). Here Haldane was learning something from the East, and it was a lesson of anti-essentialism, pluralism, and, in his approach to the ethics of experiment, the relationship between subject and object.

These lessons and transformations in his world view were neither entirely smooth nor successful. The move to Orissa met with a radical decrease in resources, but came with the unexpected benefit of a focus on natural history in the field, rather than the biology of the laboratory. Around him, Indian science was in itself rapidly transforming, and to his chagrin bureaucratizing (see Sen 2014). The laboratory was rapidly replacing the field, and the kind of researchers Haldane and Spurway came looking for was now under threat.<sup>17</sup> He was eventually to die of colon cancer on 1 December 1964. Helen Spurway was to stay on, in Hyderabad, until 1978, spending her remaining years studying animal domestication.<sup>18</sup>

## Conclusion

Studying Haldane in India opens up three opportunities for further study: on (i) the transference and translation of science in a postcolonial world (Harding 1998; Alvares 2011), (ii) the place and role of the new science in building of a new state and society in post-independent India (Bose *et al.* 1970; Brass 1990; Cheah and Bruce 1998), and (iii) the effects upon science of that encounter. Each challenges the received notion that globalized knowledge goes one way, from the centre to the periphery (Basalla 1967; Goonitilake 1984; Chakrabarty 2000; Bala 2008). Studying Haldane's transformation in India also offers a new perspective on the development and meaning of modern biology and the contentious notions of diversity, the problem of 'essentialism' (Dupré 1995; Ereshefsky 2010), the pluralism of explanations (Longino 2002), and the meaning of adaptationism (Gould 2002).<sup>19</sup> By taking into consideration its local and international interactions, this account of Haldane's encounter with India and the subsequent transformation in his understanding of the meaning of biological sciences should add to the debate over 'appropriate' sciences in a globalized world.

JBS Haldane Papers, National Library of Scotland  
 Helen Spurway Papers, National Library of Scotland  
 JBS Haldane Papers, University College of London  
 JBS Haldane Papers, Wellcome Trust Library, London  
 Indian Statistical Institute, Kolkata  
 Haldane Collections, Centre for Cellular and Molecular Biology, Hyderabad  
 Nehru Papers, Nehru Memorial Museum and Library, New Delhi  
 National Archives of India, New Delhi

## Notes on sources

- <sup>1</sup> Haldane had taken the chair in 1933.
- <sup>2</sup> In this paper, I concentrate mostly on J. B. S. Haldane and less so on Helen Spurway. Spurway's contributions to the shift

- in modern population biology, and especially her long role in independent India, has yet to be studied in any depth.
- 3 Haldane's sister, the renowned poet and scholar Naomi Mitchison, identified the key problem with this work. 'He [Clark] doesn't really find himself interested in anything except making a dramatic book which, indeed, he has done. I think he has taken a lot of trouble about the science part (but had three pages from John Godfrey – saying [sic] he got it wrong) but he is essentially a writer of, he hopes, best selling books.' (N. Mitchison to Helen Spurway, 25 October 1967; Helen Spurway Correspondence, Scottish National Library, MS20643.146a).
  - 4 Again, the remarkable exceptions are the work of Dronamraju and Veena Rao.
  - 5 His official reason for quitting turned on a long history of 'broken promises' by the University administration (see letter to University of London Senate, 23 July 1957 (Haldane Collection, Wellcome Library) regarding the Senate conferring the status of Professor Emeritus. As a parting shot, he pointed out to the University Senate: 'The ISI ... has a higher standard of research and teaching than ... Oxford, Cambridge or McGill.'). His biographers point to Helen Spurway's recent incarceration for disorderly conduct.
  - 6 The best accounts of the scientists' encounter with Marxism in the 1930s remain Werskey (1990) and Sheehan (1993).
  - 7 Haldane's various visits to India, including his visit as part of a Royal Society / British Council delegation, are documented in the 'Visits to India' file of the Haldane papers (UCL: Haldane/5/7/5). Haldane was invited again in 1953. See the June 1953 correspondence with Mahalanobis including Mahalanobis's invitation to the ISI (JBS Haldane Papers, UCL). For the statistical pilgrims, see Mahalanobis (1964) and Rau (2009). These scientific pilgrimages from Europe to India have yet to be fully explored.
  - 8 The ISI was taken as a model when the first institute of statistics was set up in the United States by Gertrude Cox (see Ghosh 1994).
  - 9 Here we might want to resist such monochromatic stories of hegemony, as propagated by certain resonances left over from the Foucaultian school of 'biopolitics'.
  - 10 Haldane took up the editorship from Punnett in 1946. The negotiations over moving the *Journal* to India are discussed in several letters to P. C. Mahalanobis, e.g. 16 January 1957 (Indian Statistical Institute Papers, 0\_30\_543FHaldaneD55P1).
  - 11 As early as his second year at ISI, Haldane and Spurway were already in deep conflict with their colleagues and the Director. An argument over curtains for their apartment would blow up into a suggestion that they move off-site (P. C. Mahalanobis to Helen Spurway, 9 October 1958; ISI Archives 0-20\_542FHaldaneD64P1). By October of 1958, Mahalanobis's patience was already worn out, and he was complaining that Haldane had a 'certain lack of balance of mind which is alarming in a scientist of his eminence' (letter from PCM, 10 October 1958; ISI Archives 0\_33\_543BHaldaneD35P-15). Mahalanobis would later accuse Haldane of colonialism and 'white man's burden' (23 October 1960; ISI Archives 0\_35-543HaldaneD97p1-4).
  - 12 The dispute between Haldane and ISI became a political hot potato, forcing the Congress government to initiate a governmental probe into the matter. The unpublished detailed records of this probe, and the ensuing correspondence, are kept in the National Archives of India, in a special file at the Mahalanobis Papers at the ISI, and the Haldane Papers at National Library of Scotland. Helen Spurway's own account is to be found in a letter to Professor L. Gallien, University of Paris (15 April 1961): 'This place is entirely under the whim of its Director. He has since WWII been entirely in politics—very sympathetic politics—he considers, very rightly, that the few scientists of an underdeveloped country have an enormous duty to play a part in planning its development. However he has not faced up to the personal consequence of dropping out of active science. This has led to rather ugly results. He will do anything to preserve his international contacts and reputation, including the offering of, at least financially excellent, possibilities of work here. I think we could have continued here indefinitely if Haldane had been content to accept favours. However he has continually annoyed by asking what his duties and rights were in the Institute, and even more by considering that facilities given to him were to be shared by his Indian colleagues! Haldane is most angered by the way in which the habit of the Director of starting projects which he can talk about abroad rather than carrying them to completion, and his arbitrary changing of plans when he loses interest, not only without informing them of the change, he has made a complete lie of the prospectus with which we have recruited students for our new university courses.' (Helen Spurway correspondence, National Library of Scotland MS20643.109-10).
  - 13 Haldane to Mahalanobis, 24 October 1957 (ISI Archives 0\_29\_543BHaldaneD43).
  - 14 For a similar view see Keller (2002). For Haldane's new concentration on 'variation', see his letter to Professor Ronald Good, 8 November 1962: 'I am more interested in the moment in variation, particularly in parts of the same plant' Haldane Papers, National Library of Scotland, MS20545.45), and to Eliot Spiess, 17 December 1962 (loc. cit. MS20545.97).
  - 15 The question of the phenomenology of the subject/object relation was later addressed in his 'Science and Indian culture': 'Personally I try not to use apparatus at all, and to get my junior colleagues to work with as little as possible. One reason for this is a moral one. The use of complicated apparatus separates scientists who use it from ordinary men who use such simple machines as ploughs and potters' wheels ... I am not a consistent Gandhian, but I certainly think that Indian scientific research would be better for adopting a few Gandhian principles, one of which is to regard machines as made to serve men, and never to think of men as made to serve machines.' (Quoted in Dronamraju 1985, pp. 175–176).
  - 16 For example, in his response to a review by H. J. Muller of Peter Medawar's recent book, *The future of man* (Medawar 1961 critique of eugenics), where Medawar claims that 'variation was good', Haldane responds with 'a plague on both your houses' and refers to the paper on rice by his Indian colleague S. K. Roy that shows that 'an approach somewhere between Muller's and Medawar's is efficient' (letter to Elizabeth Meinger, Managing Editor of the Chicago *Perspectives in Biology and Medicine*, 15 February 1961; Haldane Papers, National Library of Scotland MS20541.57) (see Mazumdar 1991).
  - 17 See the pointed critique of Haldane's view of Indian science and his emphasis on 'natural history' rather than large-scale integrated laboratory science, in Brahmachary (2014).
  - 18 Recollections of Spurway, often negative, can be found in Bhargava (2014). For the later years, see the Helen Spurway papers, National Library of Scotland. As mentioned in the introduction to this paper, Helen Spurway deserves a detailed study of her own.
  - 19 And, in a more general sense, it resists the unilinear accounts of the development of science. In the words of historian Sharon Kingsland: 'The modern synthesis followed a somewhat different course in different national contexts. These national differences were largely the result of differences in the institutional context of science, the economic resources available to evolutionary biologists, and the different developmental paths

followed by biological disciplines in different countries. The synthesis of course has no conceptual essence, but represents an evolving dialogue played over several decades across several disciplines, with individual views changing over time' (Kingsland 2003, p. 423).

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