

THE ORGANICISM OF WHITEHEAD AND THE HALDANE BROTHERS

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Abstract. Alfred North Whitehead (1861–1947) called his philosophy the ‘philosophy of organism.’ How come this mathematical physicist became a proponent of organicism instead of mechanicism? The main reason is that, early on, Whitehead clearly saw that with the advent of Maxwell’s theory of electric and magnetic fields, Einstein’s theories of relativity, and Bohr’s theory of the atom, even physics was no longer the mechanical discipline most philosophers held it for. But there was more. Whitehead knew many biologists of the first generation of organicists, and he was influenced by their organicist view. In this context, some Whitehead scholars have already pointed at physiologist of respiration John Scott Haldane (1860–1936) as a possible organicist influence on Whitehead, without however exploring this influence in depth. The aim of this paper is to remedy this shortcoming. It explores both the direct and the indirect influence of John Scott Haldane on Whitehead. The indirect influence involves a dear friend of Whitehead – John Scott’s brother, Richard Burdon Haldane (1856–1928). Hence the title of this paper: ‘The organicism of Whitehead and the Haldane brothers.’

Keywords: Whitehead, Haldane, process philosophy, organicism, humanism.

INTRODUCTION

According to Alfred North Whitehead (1861–1947), no organism can be understood in isolation from its environment. Likewise, the growth of Whitehead’s thought cannot be understood in isolation from the field of thought of the contemporary scientists and philosophers directly or indirectly related to him. The first two volumes of Whitehead’s Harvard lectures, published in 2017 and 2021 respectively, serve well to illustrate this point. Reading his Harvard student’s notes is witnessing the genesis of his process philosophy as inextricably linked, not only to the early twentieth century revolutions in physics, but also to the development of theoretical biology by contemporary biologists, including his Harvard colleagues Lawrence Joseph Henderson (1878–1942) and William Morton Wheeler (1865–1937). Due to his interaction with contemporary biologists, Whitehead referred to the modern era of science as the ‘biological age’ (HL1, p. 463), and also taking into account his own interpretation of the revolutions in physics, he wrote: ‘Science is taking on a new aspect which is neither purely physical, nor purely biological. It is becoming the study of organisms’ (SMW, p.103). The importance of the influence of multiple biologists on Whitehead’s process philosophy is demonstrated by the fact that he referred to it as a ‘philosophy of organism.’

Almost all biologists mentioned in this paper can be classified as organicists. At the end of the nineteenth century and the beginning of the twentieth century, the opposition between mechanicism and vitalism in biology was crossed by the emergence of organicism. Mechanicists were not only reductionists in holding that biological laws must ultimately be expressed in physical-chemical terms, but also in holding that physical-chemical processes were analogous to the operation of machines in the sense that each part (atom, molecule, etc.) is devoid of internal relations – that is, the essence of each part is independent of the other parts and of the whole context in which they operate – and all organizing relations are external. Both the age-old vitalism (recall Wordsworth's 'We murder to dissect') and the emerging organicism pointed out many flaws in mechanistic explanations of organic life, laying bare the inadequacy of the machine analogy for biology. In fact, vitalists and organicists had a lot in common and were often not distinguished by their mechanist opponents. As Donna Haraway writes in *Crystals, Fabrics, and Fields*:

Vitalism and organicism share basic questions and positions. From a negative point of view, both maintain that the study of the parts does not suffice to explain the behavior of the whole. The methods, and conclusions of other sciences, in particular physics and chemistry, are held to be applicable to organisms but radically insufficient. Second, the form of the whole is important in embryological development, animal behavior, reproduction and physiology. By whatever means, the properties of the whole are as essential in determining the nature and behavior of the parts at each stage in the life cycle as vice versa. Last, both organicists and vitalists stress the teleological behavior of organisms: there is at least the appearance of goal-directedness and design in biological phenomena. These properties ensure that biology is an autonomous science, not a postscript to physics. ... Nevertheless, organicists and vitalists differ fundamentally on where they locate the root of wholeness and consequent regulative behavior of organisms. Vitalists of all hues assert some nonphysical entity – either a nonquantifiable vital force ... or some basic difference between 'vital substance' and ordinary matter. Organicists insist that wholeness, relatedness, and regulation can be explained fully without such notions. (p. 33–34)

As was made abundantly clear by Erik Peterson in his 2016 book, *The Life Organic: The Theoretical Biology Club and the Roots of Epigenetics*, Whitehead's philosophy of organism was a major source of inspiration for the second generation of organicists forming the Theoretical Biology Club in the 1930s, especially Joseph Needham (1900–1995) and Conrad Hal Waddington (1905–1975), who played a central role in the creation of epigenetics. But attentive readers of Whitehead's Harvard lectures Paul Bogaard and Dennis Sölich also emphasized the reverse in 2020: the first-generation organicists Conwy Lloyd Morgan (1852–1936), British author of *Emergent Evolution* (1923), and Henderson, American author of *The Fitness of the Environment* (1913) and *The Order of Nature* (1917), were also major sources of inspiration for Whitehead. In fact, Whitehead, who scarcely

referred to his sources, did refer to them both in his published works (for example, SMW, p. vii and PR, p. 89 footnote 2). Hence, the organicists-Whitehead influence was mutual!

In “Whitehead and His Philosophy of Evolution,” Paul Bogaard passingly mentions first-generation organicist John Scott Haldane (1860–1936), brother of Richard Burdon Haldane (1856–1928) and father of geneticist and popular writer John Burdon Sanderson Haldane (1892–1964). Bogaard implies an indirect influence of John Scott Haldane on Whitehead because Richard Burdon Haldane, commonly referred to as Lord Haldane, was Whitehead’s friend in his London years. In “Whitehead’s Biological Turn,” Dennis Sölch also mentions John Scott Haldane as a third pioneer of organicism, next to Henderson and Wheeler, and he implies that Whitehead knew him because in his Harvard lectures Whitehead recalls that John Scott Haldane judged his son’s 1923 book, *Deadalus*, to be ‘full of bad physiology’ (HL1, p. 149). But neither Bogaard nor Sölch make explicit how John Scott Haldane influenced Whitehead’s organicism. It is the purpose of this paper to do so.

The influence of John Scott Haldane on Whitehead is both direct and indirect. Indirect via Lord Haldane as Bogaard implies. But also direct as Sölch implies.

The indirect influence is due to Whitehead’s familiarity with Lord Haldane’s philosophical stance in general, and toward biology in particular, and to the fact that Lord Haldane and his brother John Scott were very close and had an almost identical philosophical outlook. That they had a very similar philosophical outlook is clear from the fact that in 1883 they write a joint essay, “The Relation of Philosophy to Science,” which can be seen as the matrix out of which all their later, individual philosophical works emerged. It is not certain that Whitehead read this essay, but: in 1915, Whitehead became a member of the Aristotelian Society and Lord Haldane became his dear friend (Lowe, p. 82, p. 90, p. 259); Whitehead had many philosophical conversations with him, both at the Aristotelian Society and at home; and Whitehead assisted Lord Haldane in writing two of his books, the 1921 *Reign of Relativity*, and the 1922 *Philosophy of Humanism*, in which the joint Haldane idealist philosophy and their organicist view on biology were clearly outlined.

The direct influence of John Scott Haldane on Whitehead can be made more explicit by looking at the following facts: John Scott and Whitehead were both close friends of another biologist, D’Arcy Wentworth Thompson (1860–1948); John Scott also became a member of the Aristotelian Society in 1917; in fact, John Scott read a paper defending his organicism at a symposium co-organized by the Aristotelian Society in 1918, and Whitehead was present and took part in the discussions with John Scott; both men were also Fellows of the Royal Society; Whitehead now and again stayed at the Haldane estate in Cloan, where Lord Haldane and his brother John Scott often joined together; and finally, not only Whitehead but also John Scott assisted Lord Haldane in writing his 1921 *Philosophy of Humanism*.

My lecture has four sections. In the first one, I will provide some biographical data of the Haldane brothers. In the second, I give an account of their joint 1883 essay to introduce their idealist philosophy and their take on biology, and I then list some affinities with Whitehead's philosophy. In the third section, I focus on the 1918 symposium of the Aristotelian Society on the possibility of reducing psychology to biology, and biology to physics, and compare the views on reductionism of John Scott Haldane, D'Arcy Thompson, and Whitehead. The fourth and final section deals with Lord Haldane's 1921 and 1922 books and focuses on the influence of his humanism on Whitehead.

1. THE HALDANE FAMILY

After the death of his first wife, Robert Haldane, an Edinburgh lawyer, remarried Mary Burdon-Sanderson. The couple had six children. Their first one, Elijah, died at birth. In 1856 Richard – the later Lord Haldane – was born, and in 1858 George, who died of diphtheria in 1875. In 1860 John Scott was born, in 1862 Elizabeth, and in 1864 William. Of the four surviving children, three became sufficiently important philosophers to be included in the 2005 *Dictionary of Twentieth-Century British Philosophers*. This paper focuses on Richard and John Scott, but Elizabeth was a philosopher familiar to Whitehead as well. She wrote a book on Hegel and one on Descartes, and she translated some of their writings. She is best known as the editor and translator, in collaboration with G.T.T. Ross, of *The Philosophical Works of Descartes*. Whitehead's wife, Evelyn, gave this two-volume translation to Whitehead on his 65th birthday (Lowe, p. 222), and he used it when quoting Descartes in *Process and Reality* (see, for example, the footnotes on p. 40 and p. 41).

Richard went to Edinburgh University in 1872 to study philosophy. He formed lifelong friendships with Andrew Seth (1856–1931) and William Richie Sorley (1855–1935). During a second period of student life, Sorley also became a friend of Whitehead at Trinity College in Cambridge (ESP 7). Richard was troubled by questions of faith. The divines could not help him much, and so he was driven to the philosophers. As he could not find the answers he needed, he was sent to the University of Göttingen, where he had the good luck of studying with Rudolph Hermann Lotze (1817–1881). Lotze, trained in medicine, was in the forefront of research in physiology and psychology, and he tried to bring idealism, the philosophical current Richard favored, in line with the natural sciences. Lotze offered Richard the help he needed to find a place for religious values in a naturalistic world. When Richard returned home, he was no longer depressed as prior to his departure, but full of intellectual excitement. He shared with his younger brother John Scott, with whom he was very close, his admiration for Hegel and Goethe, the great philosopher and the great poet who were now the guiding stars of his life. Richard then continued his philosophical studies, leaving Edinburgh University with the highest honors in 1876. Destined from the first for

the English bar, he began to study law. He was called to the English bar in 1878 and established a successful practice. In 1885 he was elected to Parliament and began a parallel political career.

Meanwhile John Scott followed in the footsteps of Richard. He went to Edinburgh University to study for an arts degree with philosophy as a principal component. Like Richard, he studied under Alexander Campbell Fraser (1819–1914), who had brought out the standard edition of Berkeley's *Works*. In 1879, John Scott received his First Class Merit in Arts, with high distinction in the class of Moral Philosophy, and it was his turn to stay in Germany for a couple of months. At the University of Jena, he discussed Hegel's philosophy with other students, including Andrew Seth, the philosopher friend of Richard, and he visited various sights in the wake of Goethe. He was also impressed with the anatomy lectures of zoologist Ernst Haeckel (1834–1919) which he attended. Upon his return, he enrolled as a student of Edinburgh's Medical Faculty. Unlike his brother Richard, who studied law and became a lawyer and politician, John Scott studied medicine and became a physiologist.

This paper does not focus on John Scott Haldane's career as a physiologist specialized in respiration. However, on his many practical achievements in this respect, his biographer, Martin Goodman, writes:

Haldane delivered, for the first time, an accurate diagnosis of the greatest cause of death among miners. He gave clear recommendations about how the miners could protect themselves, and invented breathing equipment that would allow rescue teams to operate. His introduction into mines of the canary, as an early warning indicator of dangerous gases, would become so universally adopted that everyone knows the significance of 'the canary in the mine'. Haldane was himself such a canary, putting his own health and life on the line to protect others. (p. 39)

Haldane knew what mining was more precisely than any man who had gone before him. He would explore all forms of mining in the most extreme conditions. He would come to know what it was like for sailors trapped in submarines too. What it was like to be a soldier in the trenches, a diver on the seabed, a stoker in front of the hottest ovens, or a mountaineer on the highest points of the Earth. (p. 41)

When Goodman talks of soldiers in the trenches, he refers to the fact that during World War I, as from 1915, Germany was able to manufacture poisonous gas for warfare according to a production process developed by Fritz Haber, and allied soldiers in the French trenches became victims of German gas attacks. Haldane went to France to investigate the gas impact on soldiers, and he developed a gas mask model. Unfortunately, an inferior model, advocated by Churchill for domestic propaganda purposes because it could easily be produced by households, was promoted by The War Office, causing more victims of German gas attacks than were necessary. According to Goodman, next to Churchill's stature, there was an additional reason for The War Office to promote the Churchill respirators. The Haldane name was discredited in the press by absurd allegations to Richard.

Richard was a strong believer in education as engine for social progress, and much of his parliamentary work concerned the universities. He was, to give but one example, instrumental in getting the various colleges in London together as the University of London. However, in 1905 he became Secretary of State for War, and in 1912 he was made Lord Chancellor. In 1912 Richard was sent by the British government on a secret and ultimately unsuccessful peace mission to the German Kaiser, Wilhelm II, and almost at the outbreak of war, he had been unwise enough to speak of Germany – the country of Hegel and Goethe – as his ‘spiritual home’. Ripped from their context, his abortive mission and his pro-German phrase were used to picture Richard in the newspapers as a pro-German infiltrator into the heart of the British government. Richard was forced to resign as Lord Chancellor in 1915 after a vicious propaganda campaign which alleged, among other untruths, that he was an illegitimate brother of the Kaiser, had a German wife – he was in fact a lifelong bachelor – and had delayed the mobilization of the British Expeditionary Force in 1914. After his resignation, in the House of Lords, he devoted himself again to university questions, focusing on adult education. Rehabilitated, he was briefly Lord Chancellor again in the 1924 government.

Next to their respective careers as lawyer-politician and physiologist, Richard and John Scott remained passionate philosophers their whole life, and it is to their philosophy, and the affinities with Whitehead’s thought, that we now turn.

2. THE FIRST AND FUNDAMENTAL HALDANE PUBLICATION

Richard Haldane and his brother John Scott had an almost identical philosophical outlook. In 1883, they published a jointly written essay, “The Relation of Philosophy to Science,” in the seminal volume *Essays in Philosophical Criticism*, edited by Richard and his friend Andrew Seth. It was Richard and John Scott’s first philosophical publication, and it can be seen as the matrix out of which the later, individual philosophical writings of both brothers emerged.

In their essay, Richard and John Scott Haldane first focused on science and launched an attack on mechanicism:

It is impossible to conceive a universe which should be constituted out of relations of a nature exclusively mechanical. On the possibility, for example, of our conceiving what we call an organism as that in which the whole, while indistinguishable from its parts, yet determines them, depends ... the possibility of our knowledge of some of the most common features of nature, the features which embrace what we call life. (p. 43)

‘The boundlessly varying expanse of nature,’ the Haldane brothers wrote, ‘presents for reflection a sort of scale of modes of existence,’ and they distinguish the mechanic, the organic and the conscious mode of existence (p. 48). As idealist philosophers, they immediately added that these modes of existence are not ontological, but epistemological: ‘The distinction between what lives and what is

mechanical substance is a distinction of point of view and not of objects in space' (p. 52), and the same holds for the distinction between organic and conscious life. 'The phenomena of life exist... in a point of view distinct from that of the phenomena of mechanism... This is a result of the nature of knowledge, and it follows that life can never be reduced to mechanism' (p. 57). Each mode of existence in the scale presented for reflection, each level of being in the hierarchy of knowledge, each point of view, has its proper categories, and so 'the categories of mechanism do not exhaust reality in its aspect of life' (p. 45–46), and we can no more express the properties of an organism in terms of the categories of mechanism, 'than we can express the properties of a stone in terms of the categories of moral judgment' (p. 48).

When 'we treat life as a case of the interaction of molecules,' the Haldane brothers wrote, we are 'dogmatically applying mechanical categories to phenomena to which they are not adequate' (p. 57), but they added: 'No doubt we can, and for the advancement of knowledge must, at times regard other persons and even our bodies simply as physical or mechanical arrangements. But in so doing we have abstracted from a point of view from which they appear to us as something more' (p. 50). They held that 'it is not only a legitimate but a necessary procedure to consider things in abstract reference,' and added:

And this is just what physiology, as conceived by the majority of scientific men, does in regard to organization. It abstracts from the point of view of life and treats the organism as merely an exceedingly complicated mechanical arrangement, employing the categor(ies) of (substance and) causality to the exclusion of higher categories. No doubt physiology through these abstractions succeeds in advancing knowledge as it could not otherwise be advanced, for it in this way becomes an exact science, *i.e.* a science proceeding by measurement. But at the same time it gets into difficulties by the inadequacy of its category to its object, and it is forced either to admit that there is a limit to the extent of its explanations or to deny the reality of the supposed facts. (p. 53)

The Haldane brothers gave a specific example from physiology:

The action of a muscle upon a joint seems at first impression a simple case of a merely causal relation. But ... (t)he action of the muscle has a purpose in relation to the life of the individual of which it is a part ... But this feature of the facts is abstracted from when joint and muscle are considered separately from their surroundings. Such an abstraction is at times necessary for the purposes of science, but we must not suppose that it is adequate to the reality. (p. 55)

What is really implied in such words as 'function,' 'purpose,' 'means' and 'end' is that we are looking at the organism, not as acted on by things outside it, but as in teleological connection with that which is different from, but not existent independently of it. (p. 58)

Purposive or teleological relations in organic life, let alone relations of ‘reason and consequent’ in conscious life, cannot be adequately explained in terms of relations of ‘cause and effect’ (p. 61). According to the Haldane brothers, the teleological feature of life is not its only distinguishing feature. They also mention to purposiveness related features like self-preservation and the capacity of adaptation:

(T)he distinguishing feature of vital activity is self-preservation, or the conservation of the organism in a state of functional activity; and this is just as true of the most complicated actions of the human body as the movement of the amoeba towards a source of nourishment.

But besides this characteristic a living structure has a capacity of adapting itself to an infinite number of changing circumstances, which is wholly unintelligible upon any conceivable mechanical ‘scheme.’ How, for instance, is the process to be explained by which in the case of a newt there grows a new hand in the place of one which has been amputated? ... (Our) hypothesis is that each cell is directly determined in its action simply by what it has to do in order that the vital activity of the newt may be restored to its normal condition. The fact is that every part of the organism must be conceived as actually or potentially acting on and being acted on by the other parts and by the environment, so as to form with them a self-conserving system. (p. 54)

Richard and John Scott claimed that interaction of the parts of an organism is quite different from the interaction of the parts of a mechanism in which the interacting parts are considered ‘as still external to and independent of one another’ (p. 56). And they illustrated this claim with the difference between a sea-anemone and a planetary system:

In the case of a planetary system ... any planet can be detached from the system, and yet remain for the most part what it was before. It has an existence independent of its relation to other planets and the center of the system, a relation which is after all unessential to it. But it is different in the case of the system of life. If a sea-anemone is cut in two, the parts do not simply heal up and form two halves. They either die, or each half buds out and changes into a new and perfect whole. ... It would thus appear that the parts of an organism cannot be considered simply as so many independent units, which happen to be aggregated in a system in which each determines the other. It is on the contrary the essential feature of each part that it is a member of an ideal whole, which can only be defined by saying that it realizes itself in its parts, and that the parts are only what they are in so far as they realize it. (p. 56)

The Haldane brothers then compared the parts of a biological organism with the members of a social organism:

A like criticism applies to the idea of the state as a mere aggregate of isolated individuals. A less abstract category would prove more adequate to the facts in embracing, in the conception of the individual, his determination by the social organism of which he is a member. And in the light of such a conception the shortcomings of the abstractly individualistic doctrines of the Manchester school in political economy become apparent. (p. 61)

The Manchester school reduced political government to economic liberalism, but according to the Haldane brothers, social relations cannot be reduced to economic relations, just as ‘the relations of life are not capable of reduction to the relations of mechanism’ (p. 56). To try to explain an organism as a mechanism is ‘to hypostatize an abstraction’ (p. 52). It is a mistake to reduce organic life to its mechanical aspect, or conscious life to its organic aspect, or social life to its economic aspect: ‘From the relations of pure mathematics up to those of self-consciousness we have a chain of aspects of nature not one of which is reducible to another, but which are yet inseparably united together’ (p. 52).

In their essay, Richard and John Scott Haldane held that even when studying matter, scientists can fall prey to the tendency of hypostatizing abstractions:

It is no doubt quite correct to lay stress upon the mathematico-physical relations of matter, and to reason from them in an abstract reference. But even such appropriate abstractions when hypostatized in thought into real existences, share the general fate of all other abstractions, and give rise to contradictory conclusions. We can no more consistently present to ourselves matter as constituted by the reciprocal determination of points of attraction and repulsion in space, than we can conceive of matter and energy as independent existences. Such abstract conceptions, however great their value ... for the purpose of advance in knowledge, are not adequate as descriptions of a reality which is essentially concrete and inexhaustible in its properties. (p. 61-62)

An antidote to the dogmatic tendency of hypostatizing abstractions instead of being open to the inexhaustible and interwoven aspects of concrete reality is common sense – ‘those facts of common sense with which science and philosophy alike must start’ (p. 60). Of course, scientific explanations go beyond the facts of common sense, but scientists should keep in touch with it in order to resist the lure of dogmatism:

If science did nothing more than observe and record the facts of nature, such a discipline might be dispensed with. But science is concerned not merely with facts but with reasoning about conceptions abstracted from these facts ... That there is a tendency in all reasoning to hypostatize these abstractions, to regard them not in their proper light as simply fragments of thought, but as representing real existences, is as obvious as it is natural. That this has led to all sorts of difficulties, as science has proceeded out of the region of actual sense-perception, is matter of historical knowledge. If, then, it is correct to say that science is forced to go beyond what is immediate, it is difficult to avoid the conclusion of the necessity of a department of inquiry which shall deal critically with the abstractions of the enquirer, shall assign to them their true position and value, and shall make clear the real nature of scientific method. (p. 64)

For the Haldane brothers, the department of inquiry which shall deal critically with the abstractions of the enquirer is philosophy, and they added: ‘The question is not between philosophy and no philosophy, but between philosophy and

bad philosophy' (p. 64). Bad philosophy, according to them, is philosophy that falls prey to the 'prominent fallacy of the exploded *à priori* reasoning' (p. 64). The method of philosophy should be 'the method which is common to all branches of investigation, the devising of a conception, and the acceptance or rejection of that conception according as it does or does not upon application explain the facts' (p. 63).

The Haldane brothers' main recommendation with respect to the relation of philosophy to science – the ultimate topic of their essay – is to undo the separation of philosophy from science:

The history of the past relations of science and philosophy has shown that so long as the two spheres of inquiry remain in different hands – in the hands of persons who are more or less ignorant of each others' subjects – so long will science have cause to reject many of the inferences of philosophy as the intrusion into her domain of something akin to *à priori* reasoning. But it is no less true that under these conditions the philosopher must have equal cause to complain of the man of science, in that he perpetually raises difficulties insoluble for himself in his own department by the dogmatic application of mistaken categories. Such considerations point towards what seems to be becoming the conclusion of the present time, that science and philosophy can no longer be kept wholly apart from one another. (p. 65)

And in the last paragraph of their essay, Richard and John Scott Haldane wrote: 'It would therefore seem that the work of philosophy in the near future must pass into the hands of specialists in science who are at the same time masters of philosophical criticism' (p. 65–66). From a Whiteheadian point of view, this 1883 phrase sounds like the prophesy of the coming of philosopher-scientist Whitehead. And indeed, the affinities between what the Haldane brothers wrote in their 1883 essay and Whitehead's later philosophical writings is astonishing. Next to each quote from the Haldane essay, multiple quotes from Whitehead's works can be put. This paper, however, limits itself to giving a schematic comparison.

Like the Haldane brothers, Whitehead was well-aware of both the advantage and disadvantage of abstract thought:

The advantage of confining attention to a definite group of abstractions, is that you confine your thoughts to clear-cut definite things, with clear-cut definite relations. ... Furthermore, if the abstractions are well-founded, that is to say, if they do not abstract from everything that is important in experience, the scientific thought which confines itself to these abstractions will arrive at a variety of important truths relating to our experience of nature. (SMW, p. 58)
 The disadvantage of exclusive attention to a group of abstractions, however well-founded, is that, by the nature of the case, you have abstracted from the remainder of things. In so far as the excluded things are important in your experience, your modes of thought are not fitted to deal with them. You cannot think without abstractions; accordingly, it is of the utmost importance to be vigilant in critically revising your modes of abstraction. It is here that philosophy finds its niche as essential to the healthy progress of society. It is the critic of abstractions. (SMW, p. 59)

Whitehead not only agreed with the Haldane brothers on the role of philosophy, but also with their view that the separation of philosophy from science has been ‘disastrous’ (FR, p .49). This explains his disenchantment with the idealistic school in philosophy: ‘The idealistic school, as hitherto developed, has been too much divorced from the scientific outlook’ (SMW, p. 63). ‘Kant himself and his immediate followers were intensely interested in natural science. But the English neo-Kantians and neo-Hegelians of the mid-nineteenth century were remote from natural science. This (remoteness of) philosophy (from) natural science has produced unfortunate limitations of thought on both sides’ (FR, p. 61).

The Haldane brothers were idealists, and Lord Haldane labeled himself as a neo-Hegelian. And yet, thanks to the influence of Lotze, Lord Haldane argued for an idealism that took the natural sciences into account. The aim of Lord Haldane was to renew Hegelianism with the help of the recent knowledge of the natural sciences. Hence, in a 1921 letter to his friend Andrew Seth, he wrote: ‘I think I remain in the main an Hegelian, with Hegel interpreted *de novo*’ (National Library of Scotland, Haldane Papers, manuscript 5915, folio 82).

Whitehead, on the other hand, was a realist who wrote on Hegel in his “Autobiographical Notes”: ‘I have never been able to read Hegel: I initiated my attempts by studying some remarks of his on mathematics which struck me as complete nonsense. It was foolish of me, but I am not writing to explain my good sense’ (ESP, p. 7). And yet he was indirectly influenced by Hegel thanks to his neo-Hegelian friends John McTaggart (1866–1925) and Lord Haldane, and by his study of the idealism of Francis Herbert Bradley (1846–1924). In a talk he gave at the occasion of his seventieth birthday, he said:

I said very little in my book *Process and Reality* about Hegel for a very good reason. ... I have never read a page of Hegel. That is not true. I remember when I was staying with Haldane at Cloan I read one page of Hegel. But it is true that I was influenced by Hegel. I was an intimate friend of McTaggart almost from the very first day he came to the University, and saw him for a few minutes almost daily, and I had many a chat with Lord Haldane about his Hegelian point of view, and I have read books about Hegel. But lack of first-hand acquaintance is a very good reason for not endeavoring in print to display any knowledge of Hegel. (ESP p. 115–116)

And in the preface of *Process and Reality* Whitehead wrote: ‘Finally, though throughout the main body of the work I am in sharp disagreement with Bradley, the final outcome is after all not so greatly different’ (PR, p. xiii), and he wonders whether, indeed, his type of thought is not ‘a transformation of some main doctrines of Absolute Idealism onto a realistic basis’ (PR, p. xiii). Hence, Whitehead’s philosophy of organism exemplifies Lotze’s well-known saying that only inquiries conducted in the spirit of realism will satisfy the aspirations of idealism. In any case, Whitehead’s philosophy of organism has a lot in common with the neo-Hegelian philosophy of the Haldane brothers.

The Haldane brothers warned philosophers not to disregard science, but they equally warned scientist for the dogmatic application of mistaken categories to

concrete phenomena constituted by inexhaustible and interwoven aspects. And so did Whitehead. He distinguished between ‘the authority of science in the determination of its methodology and the authority of science in the determination of the ultimate categories of explanation,’ and he added:

We are then led to consider the natural reaction of men with a useful methodology against evidence tending to limit the scope of that methodology. Science has always suffered from the vice of overstatement. In this way conclusions true within strict limitations have been generalized dogmatically into a fallacious universality. (FR, p. 27)

Richard and John Scott Haldane wrote that science, confronted with the inadequacy of its method, is forced either to admit that there is a limit to the extent of its explanations or to deny the reality of the supposed facts. Unfortunately, many scientists as well as philosophers opt for the denial, and as Whitehead wrote: ‘Philosophy destroys its usefulness when it indulges in brilliant feats of explaining away’ (PR, p. 17). For him, philosophy is all about seeing more, not less. In other words: ‘The aim of philosophy is sheer disclosure’ (MT, p. 49). Consequently, ‘one aim of philosophy is to challenge the half-truths constituting the scientific first principles’ (PR, p. 10). In 1921, in a letter to his friend Lord Haldane, Whitehead wrote:

I do not believe in the disconnection between science and philosophy ... The complementarity of things impresses itself on one. I am distrusting ruthless simplifications, neglecting half the plain facts of existence. It is intolerable arrogance to assume that what we cannot immediately fit into our petty systems must be non-existent. (National Library of Scotland, Haldane Papers, manuscript 5915, folios 97–101)

According to the Haldane brothers, an antidote to the dogmatism which is blind for various aspects of reality, is composed by the facts of common sense from which science and philosophy alike must start.’ Whitehead wholeheartedly agreed:

The organization of thought ... is rooted in ... commonsense thought. That is the *datum* from which it starts, and to which it must recur. ... You may polish up commonsense, you may contradict it in detail, you may surprise it. But ultimately, your whole task is to satisfy it. (OT, p. 112)

There is a constant reaction between specialism and common sense. It is the part of the special sciences to modify common sense. Philosophy is the welding of imagination and common sense into a restraint upon specialists, and also into an enlargement of their imagination. By providing the generic notions philosophy should make it easier to conceive the infinite variety of specific instances ... in the womb of nature. (PR, p. 17)

Whitehead continuously warned both scientists and philosophers for the ‘error of mistaking the abstract for the concrete,’ which he called the ‘Fallacy of

Misplaced Concreteness' (SMW, p. 51). And just as the Haldanes did, Whitehead utilized 'the abstract theory of political economy' (FR, p. 75) to illustrate his point:

(A)bstract political economy ... deals with men under an abstraction; it limits its view to the 'economic man.' It also makes assumptions as to markets and competition which neglect many important factors. We have here an example of the necessity of transcending a given ... scheme. Up to a point the scheme is invaluable. It clarifies thought, it suggests observation, it explains facts. But there is a strict limit to the utility of any finite scheme. If the scheme be pressed beyond its proper scope, definite errors result. (FR, p. 75)

An especially important instance for Whitehead of the fallacy of misplaced concreteness is the 'fallacy of simple location,' which is the 'presupposition of individual independence' (PR, p. 137), the supposition that everything is an aggregate of substances, each of which – following Descartes – 'requires noting but itself in order to exist' (PR, p. 6), and only interacts externally with all others substances. Whitehead argued for the alternative point of view, that everything is an organic society of occasions which are not only externally, but also internally related, meaning that the essence of each occasion is constituted by the whole of all occasions. For Whitehead, as for the Haldanes, 'the relation of part to whole' is not illustrated by the abstract planetary system, or by the abstract material system of points of attraction and repulsion, but by organisms such as the newt or the sea-anemone, and he wrote: 'The relation of part to whole has the special reciprocity associated with the notion of organism, in which the part is for the whole' (SMW, p. 149).

However, contradicting the strict Haldane hierarchy of irreducible modes of existence in the scale presented for reflection, Whitehead added: 'this relation (of part to whole) reigns throughout nature and does not start with the special case of the higher organisms' (SMW, p. 149). According to Whitehead, it is equally possible to arrive at the organic conception of the world if we start from the fundamental notions of modern physics as he did, instead of starting from the basic concepts of modern physiology as the Haldane brothers did (cf. SMW, p. 152). But like the Haldanes in their essay, Whitehead also refers to physiology to explain his organicist philosophy:

The parts of the body are really portions of the environment of the total bodily event, but so related that their mutual aspects, each in the other, are peculiarly effective in modifying the pattern of either. This arises from the intimate character of the relation of whole to part. Thus the body is a portion of the environment for the part, and the part is a portion of the environment for the body; only they are peculiarly sensitive, each to modifications of the other. The sensitiveness is so arranged that the part adjusts itself to preserve the stability of the pattern of the body. (SMW p. 149)

And just as the Haldane brothers emphasized the relevance of the concept of teleology in the realm of biology, next to the concept of cause and effect, Whitehead holds 'that the extreme rejection of final causation from our categories

of explanation has been fallacious,' and that a 'satisfactory cosmology must explain the interweaving of efficient and of final causation' (FR, p. 28).

To conclude this section on the affinity of Whitehead's thought with that of the Haldane brothers, we put two more quotes next to each other. Two of the last sentences of the 1883 Haldane essay read as follows: 'There is no finality in thought. Progress is always relative, and this form of philosophical advance can hardly be a permanent form' (p. 66). Likewise, Whitehead held that philosophers can never hope finally to formulate the ultimate metaphysical first principles (cf. PR, p. 4), and that philosophy can never shake off its status of an experimental adventure; it is an adventure in the clarification of thought, progressive and never final (cf. PR, p. 9). And at the end of the preface to *Process and Reality*, Whitehead wrote: 'There remains the final reflection, how shallow, puny and imperfect are efforts to sound the depths in the nature of things. In philosophical discussion the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly (PR, p. xiv).

3. THE 1918 SYMPOSIUM

On July 6th, 1918, at the University of London Club, a symposium was held on the question: "Are physical, biological and psychological categories irreducible?" John Scott Haldane and D'Arcy Thompson spoke on the subject-matter of the papers they had contributed. Between seventy and eighty members of the Aristotelian Society, the British Psychological Society and the Mind Association were present, including Lord Richard Haldane and Whitehead, who took part in the discussion with the speakers.

John Scott Haldane and D'Arcy Thompson were the same age and friends since childhood. When they spoke at the symposium in 1918, they were famous biologists, John Scott Haldane a physiologist and Thompson a morphologist. Both had published an important book in 1917. John Scott Haldane's *Organism and Environment as Illustrated by the Physiology of Breathing*, was one of the many writings in which he attacked mechanistic reductionism and promoted organicism. In it he wrote: 'It has been suggested to me that if a convenient label is needed for the doctrine upheld in these lectures, the word "organicism" might be employed' (quoted by Haraway, p. 36). D'Arcy Thompson's *Growth and Form* was epoch-making in its endeavor to treat biological growth and form in physico-mathematical terms. Thompson was one of Whitehead's friends from his undergraduate days at Trinity College in Cambridge (ESP 7), and – as pointed out earlier – Lord Haldane was John Scott's brother and Whitehead's friend.

Even though the discussion on July 6th, 1918, was one among friends and there is no written record of it, it must have been a heated discussion. In his paper, John Scott Haldane argued for the irreducibility of the physical, biological and psychological categories. Given their shared view, Lord Haldane must have sided with his brother. Both conceived of reality as one but held that the human mind only sees partial aspects of it, which depend on the point of view. The point of view of the physicist is different

from that of the biologist, and this from that of the psychologist. The physicist's categories, apt to study the physical aspects of reality, can therefore not be extended to the biological realm, and the biologist's categories not to the psychological realm. In his paper, D'Arcy Thompson agreed with John Scott Haldane that the psychological categories are irreducible and admitted being a matter-mind dualist. But he firmly believed that biological categories could be reduced to physical categories, and pointed out that his 1917 book was there to prove it because in this book, physico-mathematical categories were adequately applied to the phenomena of growth and form in organisms. And then there was Whitehead, the mathematical physicist who was inspired not only by modern biology and psychology, but also, and foremost, by Maxwell's electromagnetic field theory, Einstein's theories of relativity and Bohr's model of the atom (his early quantum theory). In his writings, Whitehead rejected all reductionism, and argued for a conceptual revolution to arrive at a synoptic view adequate to all that seems lifeless and living, material and mental. Hence, he must have disagreed with the other three disputants on how to answer the question that kicked-off the symposium.

Let's have a closer look at the three conflicting visions. To start with, in his paper, John Scott Haldane wrote: 'I propose to maintain that our ordinary working conceptions of what we regard as physical, biological and psychological phenomena are not only different, but irreducible to one another' (p. 410). He did admit that 'it is certainly true that physical and chemical explanations are being profitably applied to more and more of the phenomena associated with life' (p. 421), but he stressed that 'we must look upon organism and environment as one interconnected whole, in which ... the organism tends to maintain itself,' and added that 'from no elementary physical or chemical principles can we deduce (this) behavior of the organism' (p. 426). 'For a more detailed discussion of this position in the light of the empirical facts of physiology' he referred to his recent book, *Organism and Environment* (p. 430). Then he transitioned from biology to psychology as follows:

It has already been pointed out that the world of mathematical physics is a very imperfect presentation of reality, and that in the biological world much more reality is presented. In the world of psychology still more reality comes before us. The real world is not merely a physical or biological world, but also a *known* world. In identifying it as a known world we are making use of an additional category or working hypothesis. (p. 432)

John Scott Haldane did not agree with those who look upon consciousness 'as a mere accompaniment of physical and chemical changes in nerve-cells' (p. 432) and held that 'psychological phenomena ... have no "objective" existence and are only subjective accompaniments' (p. 433). According to him, 'this assumption is baseless,' and he appealed to common sense when explaining it as follows:

The objective behavior of a conscious organism or person is quite distinct from that of an unconscious organism, although at the lowest of consciousness the distinction may be so faintly marked that we are left in doubt, just as at the

lowest stages of life we can hardly distinguish the living from the non-living. When we perceive a person it is most certainly a person, and not a mere organism, that we perceive. It is only by a process of abstraction from the full objective reality that we can regard him as a mere organism. The doctor or physiologist is constantly performing with great pains this act of abstraction ... (p. 433-434).

John Scott Haldane, at the end of his paper, turned to philosophy and, true to idealism, he wrote:

From the point of view of each individual science there is a conflict of categories or fundamental hypotheses with those of other sciences; but from the wider standpoint of philosophy these categories are only provisional working hypotheses. The world of our experience is a spiritual world ...; and this being so we must regard categories as only forms which the riches of the spiritual world pass through in the course of their ever fuller manifestation. (p. 435-436)

Turning to D'Arcy Thompson's paper, it is fair to say that it was written to undermine his friend John Scott Haldane's paper. Even though Thompson granted John Scott's point as regards the irreducibility of the categories of psychology to those of biology, his paper is a compilation of arguments against the irreducibility of the concepts of biology to those of physics.

One of Thompson's most convincing arguments goes as follows. John Scott Haldane seemed to interpret 'physical' by 'physico-chemical' science. But by recurring again and again to chemistry instead of physics to illustrate the mechanistic approach to the phenomena of physiology, John Scott recognized the undoubted fact that the categories of chemistry include much more than is contained in those of ordinary physics. Consequently, John Scott should have drawn a contrast not only between the categories of physics-plus-chemistry and those of biology, but also between those of physics and those of chemistry. The reason he didn't, is clearly his conviction that the breach between physics and chemistry will be removed sooner or later by reducing the categories of chemistry to those of physics. But if John Scott did believe the latter, Thompson argued, then he was inconsequent not to believe that sooner or later the gap between the categories of biology and those of physics will also be bridged by reducing the former to the latter.

Thomson himself certainly believed that such a reduction will occur in the future. According to Thompson, the history of physics learns, that when its categories no longer apply to a class of phenomena, physicists 'refine and improve the old categories' until they are adequate again; 'they create new ones perhaps, but these new ones are of the same nature and are commensurate with the old' (p. 446). Thompson captured this historical lesson in an image:

A certain physical explanation of a physical phenomenon is found to be inadequate; a mechanical explanation, simple and for a long time acceptable to all, is no longer satisfying. But a wise man finds a certain key at his girdle, a

new key of the old bunch, and unlocks the gate, and pursues his journey. I draw the simple lesson that, when a closed gate confronts us in our way, we had better wait and search for a key, and that we should be very loath indeed to forsake the pathway for the open fields. (p. 445)

'I for my part,' Thomson wrote, 'look forward, in faith and hope, to the ultimate reduction of the phenomena of (life in general and) heredity (in particular) to much simpler categories, to explanations based on mechanical lines' (p. 451). If the mechanical principles do not obviously apply, he stated, 'I wait in patient expectancy for more light, but I do not hurry to change my old lantern for a new' (p. 457).

Thompson, however, did more than patiently wait. He did not only complain that John Scott Haldane was 'difficult to understand' (p. 448-449) and that John Scott did not define what he really meant by the categories of biology, leaving Thompson 'in some doubt as to what they precisely are' (p. 450). No, Thompson tried to give a clear definition of biology. He defined biology as 'the study of the forms, whether gross or molecular, assumed by matter in the fabric of living things, and all the changes, processes, activities associated therewith, so far ... as we can study them apart from consciousness, or conscious reactions' (p. 437). And Thompson did not only criticize John Scott's illustrations from physiology. No, 'choosing rather the morphological side than the physiological side of the common field of biology,' Thompson illustrated his own position by such facts as these: 'When I regard the minute and simple organisms, whether unicellular or multicellular, I see among their multitudinous forms a large number which are easily described and classified in physical terms' (p. 456). And he added:

Dr. Haldane has referred you to a book of his; may I say that I have written a book too? And in it, from beginning to end, I have sought to show that the phenomena of Growth and of Form in organisms are phenomena to which the working hypotheses, or categories, of physico-mathematical science strictly, and even adequately, apply. (p. 458)

Prior to turning to Whitehead, I return briefly to John Scott Haldane. In his paper, John Scott hinted at the fact that 'even from the purely physical standpoint, (the mechanical conceptions) are no longer adequate' (p. 429). Most likely, he referred to the fact that the old mechanical conceptions are no longer adequate with respect to quantum phenomena. As his biographer Martin Goodman writes, John Scott knew about Bohr's quantum theory of atomic structure because he befriended Niels Bohr. This friendship came about as follows.

In 1893 John Scott Haldane set out for the Copenhagen laboratory of Christian Bohr, a Professor of Physiology at the University of Copenhagen, who was twice nominated for a Nobel Prize to award his pioneering research into respiration. His visit to Christian Bohr was an invaluable experience for John Scott. He found in Christian Bohr a kindred spirit regarding both physiology and philosophy, and he was very fond of Harald and Niels, Christian Bohr's children. And so the Haldane and the Bohr family kept in touch, and later in life, on several occasions, John Scott met with Niels Bohr.

In the context of this paper, it is important to highlight that the philosophical outlook of Christian Bohr, which had a lot in common with John Scott's, has influenced Niels Bohr, and that Niels Bohr in his turn has influenced John Scott. With respect to the influence of the elder on the younger Bohr, Henry Folse writes in his 1985 book *The Philosophy of Niels Bohr: The Framework of Complementarity*:

(Christian Bohr's) interests focused on the problem of the proper description of physiological processes and the resulting controversy between mechanistic and teleological modes of description. Christian Bohr discussed these questions ... in groups that met regularly at the Bohr home. The young Bohr brothers were permitted to audit these sessions. (Niels') father's position was conditioned by the then current ... reaction against (mechanicism). The elder Bohr rejected the attempt to formulate strictly mechanistic descriptions in biology and insisted on the need for ... teleological accounts of physiological processes. Niels tells us directly that this issue of mechanism versus teleology was important in his own intellectual development. In an essay ... he quotes approvingly the following passage of his father's work:

As far as physiology can be characterized as a special branch of natural science, its specific task is to investigate the phenomena peculiar to the organism. ... It is ... in the very nature of this task to refer the word purpose to the maintenance of the organism ... Just in this sense we shall ... use the notion of purposiveness about organic functions. In order that the application of this concept in each single case should not be empty or misleading it must, however, be demanded that it be always preceded by an investigation of the organic phenomenon under consideration sufficiently thorough to illuminate step by step the special way in which it contributed to the maintenance of the organism.

The younger Bohr understood his father to be claiming that when the descriptive concepts are precisely defined, there need be no collision between purposive and mechanistic descriptions. Indeed he argues that inasmuch as purposiveness is experienced as a characteristic of phenomena to be explained in biology, such a concept cannot be purged from the descriptive vocabulary of physiology if biological descriptions are to be true to experience. This concern with the empirical situation in which concepts become applicable to the description of phenomena becomes a hallmark of complementarity. (p. 45-46)

With respect to the influence of Niels Bohr on John Scott Haldane, one might expect that John Scott applied Bohr's idea of complementarity – the idea that phenomena are too complex to be described by a single set of concepts; that several point-of-view-dependent and irreducible sets of concepts are needed. However, in 1918, Bohr had not yet applied the idea of complementarity to the fundamental physical concepts himself. Only Bohr's model of the atom of 1913 was known. Hence, during the 1918 symposium, John Scott could not apply the idea of complementarity to the relationship between the set of physical concepts, the set of biological concepts, and the set of psychological concepts – and in fact, he didn't later in life either. Instead, as

Goodman writes, John Scott Haldane saw Bohr's quantum theory of atomic structure as an incursion of biological ideas into the realm of physics, a promising foretaste of some future merger of the natural sciences' (p. 358).

Hence, whereas John Scott did not believe in the application of physical concepts in biology, he left open the possibility of the application of biological concepts in physics. This is inconsistent with the Haldane claim that the physical and the biological point of view, being different and irreducible, require different and irreducible concepts. And yet, ten years prior to the symposium this section deals with, in 1908, John Scott already wrote: 'That a meeting-point between biology and physical science may at some time be found, there is no reason for doubting. But we may confidently predict that when that meeting-point is found, and one of the two sciences is swallowed up, that one will not be biology' (quoted by Sölich, p. 108). And six years prior to the symposium this section deals with, in 1912, the *Scotsman* reported of John Scott Haldane: 'He believed that we should trace back life further and further, and that some day we should trace it back into what is now called the inorganic world, and when we had traced back life so far as that, the inorganic world would be no longer inorganic; it would be an organic world' (quoted by Goodman, p. 352).

Turning to Whitehead now, his view on the matter was close to the previous two quotes from John Scott Haldane. In 1925, in *Science and the Modern World*, he wrote: 'Science ... is becoming the study of organisms. Biology is the study of the larger organisms; whereas physics is the study of the smaller organisms' (SMW, p. 103). It is interesting to notice that Whitehead's statement, which was at variance with Bohr's complementarity view, was close to the following, later statement of another of Bohr's critics, David Bohm (1917–1992):

While we do not wish to suggest that the analogy between electrons and living beings is complete, we do wish to emphasize that it goes far enough to show that physics has really abandoned its earlier mechanical bias. Its subject-matter already, in certain ways, is far more similar to that of biology than it is to that of Newtonian mechanics. It does seem odd, therefore, that just as physics is moving away from mechanism, biology and psychology are moving closer to it. (Quoted by Midgley, p. 96)

It is fair to assume that during the discussion at the 1918 symposium, Whitehead contradicted the main irreducibility argument outlined by John Scott Haldane and his brother Richard, and that he took his distance from both the biology-to-physics reductionism and the matter-mind dualism of his friend D'Arcy Thompson. According to Whitehead, the symposium question on the reducibility or irreducibility of the concepts of physics, biology and psychology is simply a false issue. This is explained by Donna Haraway in *Crystals, Fabrics, and Fields*:

(T)he certainties of physics shattered in the twentieth century. In 1925, Alfred North Whitehead published his *Science and the Modern World*, in which he outlines the events of the second critical period for biology. If field theories (and especially Maxwell's theory) alone had not, relativity theory and quantum mechanics had broken the axis of the machine analogy for physics. Even the ultimate elementary unit of matter ... was doing unexpected things and

directing trusted, intelligent men such as Whitehead, a mathematical physicist, to think in terms of organization, wholes, and internal relations. Reductionism no longer seemed simple, because physics and chemistry themselves were outgrowing the mechanism that made this form of reductionism so attractive. The foundation for the unity of science would have to be sought elsewhere.

All these observations are very simpleminded. However, it is necessary to remember that biology could not have developed a respectable organicism until rigid determinism broke down in physics and minds were freed to feel the strains and contradictions of naïve mechanism. For anyone in the eighteenth century to have felt that biology might be more fundamental ... than physics would have been absurd. But this is exactly what J.S. Haldane thought in the late nineteenth and early twentieth centuries. He was accused of being a vitalist; he was only a bit unclear. But Whitehead too insisted that the unity of science was based on organic "events" rather than simple atoms; he was somewhat clearer. ... As Kuhn noticed, a crisis in a paradigm could not lead to abandonment of the paradigm until an alternative was available. Biology could not seriously explore an organicism in response to its own crisis until its relation to physics was changed. ...

(T)hat biological laws must ultimately be expressed in physical-chemical terms ... is reductionism in the sense that physics is the foundation of science. Nothing is directly said about the nature of physical-chemical theory to which biological explanation must be reduced. It is obviously futile to argue against the prediction that a future body of theory will (as D'Arcy Thompson held, RD) or will not (as the Haldane brothers thought, RD) comprehend a given set of phenomena. As Whitehead observed early, physics itself now has vastly different conceptions of organization, causality, and determinism and thus of fundamental explanation. When the very categories of explanation being contested are being abandoned, reductionism becomes simply a false issue. (p. 24-26)

4. LORD HALDANE'S HUMANISM

As we have seen, Lord Haldane (and his brother John Scott) conceived of reality as one but held that the human mind only sees partial aspects of it, which depend on the point of view. This implies the relativity of all knowledge, and this epistemological relativity explains Lord Haldane's interest in Einstein's theory of relativity. As Rudolf Metz writes in *A Hundred Years of British Philosophy*:

Relativity was one of his (Lord Haldane's) central ideas, which he argued out on purely philosophical grounds before the publication of Einstein's theory, in his *Pathway to Reality* (1903-4). Seeing later what he took to be its confirmation in Einstein's theory, he elaborated it further, chiefly in his *Reign of Relativity* (1921). Reality is one, but its oneness or totality is not at first evident to the human mind, which sees only partial aspects of it and considers these in their particular structure and manner of being from a particular point of view. ... Every particular point of view is merely relative when considered in the light of reality in its wholeness. This, roughly, is the general and purely philosophical principle of relativity, of which, according to Haldane, Einstein's principle is only a special application. (p. 315)

Lord Haldane became a great admirer of Einstein, and convinced Einstein to visit the UK upon his return from his first trip to the US in 1921, and to stay at Lord Haldane's home. Thanks to Lord Haldane, Einstein's visit to the UK offered both John Scott Haldane (cf. Goodman, p. 348-349) and Whitehead (cf. Desmet, p. 29-34) the opportunity to meet Einstein and have lively philosophical conversations with him. Four years later, in his Harvard lectures, Whitehead still referred to his discussion with Einstein in Lord Haldane's study at Queen Anne's Gate in London in order to make clear their different take on relativity (HL1, p.185 & 187). This, however, is not the topic of interest in this section. The aim is to show how Lord Haldane's humanism influenced Whitehead, and how Whitehead must have interacted in person with John Scott Haldane.

The first Haldane book to better understand the mutual Haldane-Whitehead influence is Lord Haldane's 1921 book, *The Reign of Relativity*. In *Haldane: The Life of Viscount Haldane of Cloan*, Lord Haldane's biographer – Frederick Maurice – reflects on the success of *The Reign of Relativity*:

Much of his success was, of course, due to the wide interest which Einstein's statement of his theories had aroused, but the book had its origin not in Einstein, but in the development of Haldane's philosophical thought. It was a natural progression from the second volume of *The Pathway to Reality*. He had begun to meditate on this progression as soon as he left office in 1915 and *The Reign of Relativity* was the result of years of thought and of much reading and research. Einstein had acted as a spur to what was already moving in his mind. In the earlier work he had maintained the principle of degrees in knowledge and reality alike. From this it was but a step to the relativity of knowledge, the main thesis of *The Reign of Relativity*. (p. 98)

One might summarize Maurice's comment on *The Reign of Relativity* by saying that the principle of relativity was not new to Lord Haldane's philosophy. This summary invites us to oppose Whitehead and Lord Haldane, for Whitehead considered Einstein's relativity as a quite novel element in the history of thought.

Although Whitehead may not have shared Lord Haldane's incorporation of the theory of relativity in an existing philosophy of the idealist brand, it did not prevent him from helping Lord Haldane, when the latter wrote *The Reign of Relativity*, with the mathematics of Einstein's theory (Lowe, p. 82) and from drawing some important philosophical lessons from Haldane's humanism (the topic of his section). On the other hand, it did not prevent Lord Haldane from devoting twenty pages of his 1921 book to Whitehead's *Principles of Natural Knowledge* and *Concept of Nature*. Haldane's extensive treatment of Whitehead's books in *The Reign of Relativity* started as follows:

It is interesting that an explanation has been insisted on in England of the whole doctrine of relativity which ... is more thorough in the logical treatment of relativity than anything I have so far become acquainted with in the works of either Einstein himself or of his disciples in Germany. The author of this explanation is Professor A. N. Whitehead, who has set it forth in detail in two recent books, *The Principles of Natural Knowledge* and *The Concept of Nature* ... (p. 63)

Apparently, Haldane's admiration for Whitehead equaled, or even surpassed, his admiration for Einstein. This impression is confirmed by three more quotes from *The Reign of Relativity*.

Lord Haldane wrote: 'Mathematicians and physicists ... cannot stand still. Bold leaders, like Einstein and Whitehead, are beckoning them forward, from ground which is treacherous into territory which may or may not prove secure' (p. 75). And: 'Only one equipped as is Professor Whitehead with both mathematical and logical science of the highest order could have explored hitherto unfamiliar ground with the originality and the thoroughness which he has shown to us' (p. 81). And once more: 'Professor Whitehead seems to me to have brought out (the character of space and time) in his treatment of relativity more thoroughly than Einstein ... himself has done' (p. 116).

This kind of treatment is certainly reason enough to make one blush, and after receiving Lord Haldane's 1921 book by mail, Whitehead wrote to him on May 26, 1921:

This afternoon also brought me the copy of your book which you have been good enough to send me. In looking over its pages I have felt overwhelmed by your generous treatment of my work. I can only tell you – and it is the only thanks worth rendering – that it is an immense encouragement and the most solid honours which I can hope to attain. (National Library of Scotland, Haldane Papers, manuscript 5915, folio 17)

Apart from the encouragement of a friend, Whitehead also benefited from some valuable philosophical lessons on humanism thanks to his friendship with Lord Haldane and his reading of Lord Haldane's 1921 and 1922 books. Indeed, in *The Reign of Relativity* Lord Haldane extended his treatment of relativity first from the domain of physics to the domain of knowledge, and then from the domain of knowledge to the domain of ethics. He extended Einstein's theory of relativity to a relativistic epistemology, but also goes beyond epistemology when, at the end of his book, he asks: 'Assuming the principle of relativity to mean all that has been said, what guidance does it offer for the conduct of our individual lives?' (p. 425). Lord Haldane did not think this question is difficult to answer. According to him, the relativity of all knowledge clearly implies an ethics of tolerance, and he wrote that when we are fully aware of this relativity, there may come to us 'contentment of spirit, and a peace which passes our everyday understanding. We grow in tolerance, for we see that we are all of us more, even in moments of deep depression, than we appear to ourselves to be, and that humanity extends beyond the limits that are assigned even by itself to itself.' (p. 426)

This important lesson of Haldane's 1921 book did not escape its reviewers in the British newspapers. In *The Times* of May 27, 1921, a correspondent wrote: 'Lord Haldane's volume, *The Reign of Relativity* ..., published today, gives us fresh hope. ... As a warning against a disastrous dogmatism the principle of relativity, in this sense, although hardly original, cannot be enunciated too frequently' (National Library of Scotland, Haldane Papers, manuscript 6105, page

114, folio 142). In *The Sunday Times* of May 29, 1921, Whitehead's friend Wildon Carr (1857-1931) wrote in his review of the book: 'Perhaps the most interesting pages are near the end ... Apparently, the chief practical lesson that the ex-Chancellor has learnt from life is toleration ... (National Library of Scotland, Haldane Papers, manuscript 6105, page 115, folio 143). The same warning against dogmatism, and the same promotion of tolerance, are important messages of Haldane's 1922 book, *The Philosophy of Humanism*.

In the preface of *The Philosophy of Humanism*, Lord Haldane wrote:

As regards two of the scientific subjects discussed, I am under much indebtedness for council and assistance while working out the principle. Professor A. N. Whitehead, F.R.S., has gone over the proofs of the three chapters devoted to mathematical physics. My brother, Professor J. S. Haldane, F.R.S., has done the same for the chapter on biology. (p. vi)

The abbreviation, F.R.S., stands for Fellow of the Royal Society. As said in the introduction, both Whitehead and John Scott were Fellows of the Royal Society, and they both helped Lord Haldane in writing his 1922 book. Whitehead was certainly acquainted with John Scott Haldane's organicism because he read *The Philosophy of Humanism*, and its chapter on biology is a pure reflection of John Scott's view on biology which, as stated before, did not differ from Lord Haldane's and from the view expressed in their first and joint publication (cf. §1). Maybe Whitehead did not read the 1883 essay of the brothers Haldane, but Lord Haldane began his biology chapter in *The Philosophy of Humanism* as follows:

Thirty-eight years ago, I wrote in conjunction with my brother, now Professor J. S. Haldane, an "Essay on the Relation of Philosophy to Science." ... Since those days he has continued to work at problems in physiology, while I have been occupied with other subjects. ... But a good deal of reading and discussion has tended to strengthen the view, first formed more than thirty-eight years ago ... (p. 196–197).

Everyone reading both the 1883 essay and the 1922 biology chapter can confirm the claim of this last quote. Consequently, Whitehead did not have to read the 1883 essay to become familiar with its contents. His many talks with Lord Haldane, his participation in the 1918 symposium, and his reading of Lord Haldane's 1922 book were sufficient.

Let's return to Lord Haldane's inspiring humanism. The issue of the unavoidable limitation of all knowledge, implied by the overall relativity of things and thoughts, is treated in *The Philosophy of Humanism* as the issue that knowledge cannot be but an abstraction from concreteness. Haldane's 1921 warning that the real always extends beyond the boundaries of our knowledge, was translated in his 1922 warning that the real is always more concrete, even in its general principles, than our abstract knowledge of it.

Lord Haldane wrote: 'The real is never abstract. It is always concrete, even in its general principles. This is a plain and obvious truth. We fall in love with

persons, not with qualities. It is just you, here and now, that we turn to, not to any abstract construction out of general principles' (p. 87-88). But he added that our knowledge of the real is never concrete; it is always abstract, even in its most concrete bits and pieces. Hence, the unreachable aim of human knowledge, whether in science or philosophy, in art or religion, must be the point where the abstract general principles of knowledge meet the concrete general principles of reality. According to Lord Haldane, trying to capture the general principles while bypassing the concrete is falling 'into the sin of the abstract mind,' whereas trying to capture the concrete while bypassing the general principles, is falling 'into the disorderliness of those who build on shifting sand,' and he added:

The well-balanced intelligence takes full account of both aspects, refusing to be plunged into abstractions, on the one hand, or to live from hand to mouth, on the other. The mind of genius reaches a yet higher level, for it does justice to the claims of both by bringing them into larger wholes in which the two aspects are transcended and so reconciled in a fuller entirety. This is the secret of genius alike in poetry and in science. It is such genius that we see also in the highest triumphs of religion and in the most penetrating insight in science and philosophy. (p. 92)

In conclusion, Lord Haldane urges his readers 'to direct (their) attention to the fullness and richness of life, and to interpret these from a really comprehensive outlook' (p. 99).

In the Daily News of June 22, 1922 – the day *The Philosophy of Humanism* was published – Evelyn Underhill asked: 'What is the contribution of humanism as Haldane defines it?' And she replied: 'I think the answer must be this: it releases us from the tyranny of abstractions' (National Library of Scotland, Haldane Papers, manuscript 6105, page 133, folio 163). Underhill's review must have pleased Lord Haldane, and even more so, Whitehead's assessment of his 1922 book. In a letter written to Haldane on June 27, 1922, Whitehead thanked Haldane for sending his book, and he added:

I was delighted to find that you start from the concrete fact – our 'enjoyment' of life – and postpone to the latter half of your lectures the abstractions of science. This procedure is consonant with your philosophical outlook, and is also one of the ways in which a philosopher who is also a statesman may correct philosophers who are also professors. I am more and more convinced that a thoroughgoing examination of abstractions and relatedness should be the starting-point of philosophy. If I construe rightly your attitude, you are a pioneer in enforcing this doctrine. (National Library of Scotland, Haldane Papers, manuscript 5915, folio 183)

It is obvious that Lord Haldane's humanism was consonant with Whitehead's developing philosophical outlook, and even guided Whitehead to a certain extent. To Whitehead's claim, that a thoroughgoing examination of abstractions and relatedness should be the starting point of philosophy, one can immediately add

that it is exactly this kind of examination of the paradoxical interplay of the concrete and the abstract, and of the relatedness of all events, which led to Whitehead's philosophical masterpieces. The secret of Whitehead's success coincides with the secret of genius Lord Haldane wrote about.

I cannot conclude my account of the importance of Lord Haldane for Whitehead, without quoting the touching words Whitehead wrote to him on July 24, 1924, prior to leaving England for the US:

I am so greatly in your debt on so many sides that now that I am going away and want to express myself, I hardly know where to begin.

Beyond your kindness, which I have loved, and the interest of the great affairs which you have controlled, there is something that lies so much deeper that I cannot put it in the short phrases of a note: It is the example of your faith which has cheered me so much. I mean your unshaken belief that the philosophic impulse is not a minor curiosity, but a search for the solid basis of reason on which human faith can rest. (National Library of Scotland, Haldane Papers, manuscript 5916, folio 129)

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