Endeavour Vol. 38 No. 3–4

Evolution in a fully constituted world: Charles Darwin's debts towards a static world in the *Origin of Species* (1859)

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The Transformist Revolution was a long intellectual quest that has expanded from the 18th century to today. One area of inquiry after another has confronted the necessity of recasting its object of study under an evolutionary view: human history, geology, biology, astronomy, etc. No single scholar fully managed to make the transition from a static worldview to an evolutionary one during his or her own lifetime; Charles Darwin is no exception. Many versions of evolutionism were proposed during this revolution, versions offering all sorts of compromises between old and new views. Not sufficiently acknowledged in the historiography is the profoundness of Darwin's debts towards the old static view. As a dual child of the Scientific Revolution and natural theology, Darwin inherited key concepts such as stability, completeness, timelessness, unity, permanence, and uniformity. Darwin took these concepts into consideration while erecting his theory of biological evolution. Unsurprisingly, this theory was ill-equipped to embrace the directionality, historicity, and novelty that came along with a new evolutionary world. This paper analyses a fundamental idea at the heart of Darwin's *Origins of Species* (1859) inherited from a static, stable, and machine-like conception of the world: the notion of a fully constituted world. Although in principle antithetical to the very idea of evolution itself, Darwin found a way to 'loosen up' this notion so as to retain it in a way that allows for some kind of evolutionary change.

Introduction

To the layperson today the name of Charles Darwin is usually associated with the notion of evolutionism; in fact, he is the very figurehead of this movement. Historical and philosophical studies about Darwin – sometimes referred to as the 'Darwin industry' –, have matured enough to teach us, however, that he was not an unconditional evolutionist in the sense that, for him, life was not endowed with an inherent capacity to evolve progressively at all cost, as essentially postulated in works of Jean-Baptiste Lamarck's *Philosophie zoologique* (1809) and Robert Chambers's *Vestiges of the Natural History of Creation* (1844). Rather, Darwin's evolutionism was of a special kind which owed much to his being fully aware of a necessary relationship between life forms and their environment: life forms are entities in need of places allowing them to survive and make a living. That is why Darwin's theory of biological evolution in the *Origin of Species* (1859) appeals to notions such as: (1) living matter itself is inert; there will be no evolution if the environment remains perfectly stable; (2) only an external force called natural selection can put life in motion; there is no internal drive to evolution; and (3) life forms change to keep something unchanged, since adaptation is merely a trick to stay alive.

A significant number of explanatory components in Darwin's theory appeal to stability or lack of change. This has been acknowledged by some darwinian scholars. For instance, Camille Limoges noted the timelessness of Darwin's theory which seeks an explanation not in the historical past of species themselves but rather in their ecological adaptation as exclusively revealed today.[1] Similarly, Stephen Jay Gould identified this timelessness in Darwin's partial support for a steady-state view in which no biological direction is recognized; the theory of natural selection being based on the adaptation to local conditions only. Biological progress, if there is any, is merely a by-product of this adaptive process and not its essential goal.[2] Surely, these assessments are suggestive enough to warrant researching further the theme of stability or statism in Darwin. Darwin's work contains both a multitude of sources of inspiration and numerous internal tensions.[3] It is no surprise, then, that the recent historiography would have come up with as different a view of Darwin as can possibly be imagined.[4] This paper is

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Available online 10 November 2014.

[1] Camille Limoges, 'Introduction,' in C. Linné, *L'Équilibre de la nature* (Paris, 1972), 7–22, footnote p. 12.

[2] Stephen Gould, 'Eternal Metaphors of Palaeontology', in A. Hallam (ed.), *Patterns of Evolution, as Illustrated by the Fossil Record* (Amsterdam, 1977), 1–26, at 5, 13–14.

[3] John Greene, 'The History of Ideas Revisited', *Revue de Synthèse*, 4th series, No. 3 (1986), 201–227, at 210.

[4] Robert Richards, 'Michael Ruse's Design for Living', *Journal of the History of Biology*, 37 (2004), 25–38; Michael Ruse, 'The Romantic Conception of Robert J. Richards', *Journal of the History of Biology*, 37 (2004), 3–23.

  http://dx.doi.org/10.1016/j.endeavour.2014.10.006

exclusively concerned with the parts of Darwin's theory presented in the first edition of the *Origin of Species* (1859) which appeal to a static view inherited from previous centuries.

The Scientific Revolution and natural theology

The dominant intellectual event of the centuries prior to the publication of Darwin's *Origin* was the 'Scientific Revolution'. Historians of science today are not inclined to use that expression without qualifications, if only because the Scientific Revolution tends to dissolve itself on closer analysis; after all, changing intellectual movements have no essences.[5] Yet, the fact remains that very few of them would be prepared to go so far as to claim that nothing important has happened in western science between 1500 and 1800. For our purposes, it will suffice to recognize that the Scientific Revolution was constituted of distinct intellectual currents, several of which contributed to putting in place a mechanistic philosophy of nature.[6] More specifically, the part of the Scientific Revolution which concerns us most is the one that became fused with natural theology, the quest to inquire into the existence of God through the investigation of His creation.[7] Taken together, they achieved the establishment of a powerful and lasting worldview imposing the model of a designed and machine-like clockwork universe. The implications and ramifications accompanying this model are profound and numerous[8]: a machine is lifeless and devoid of intelligence; it is in need of a creator for its existence; it cannot come into existence in piecemeal fashion for it would not be functional, and thus has to be perfect and fully constituted; it constitutes a finished, stable, static, closed, balanced, ordered, harmonious, and permanent system; it is built around distinct complementary parts fitted and contrived together; it cannot be modified without breaking down, depriving it of a past or future which differs from the current observed state; it requires an external force or law to put it in motion; it was designed for a specific purpose. The paradigmatic example of such a model was, of course, the celestial mechanics of our Solar System: perpetual motion within a perfectly ordered and stable world.

Living in the nineteenth century, was Charles Darwin actually exposed to all these ideas? The papers presented in this special issue suggest that he was. Furthermore, let us insist on two additional sources of inspiration. First, through his personal acquaintance with the geologist Charles Lyell and his *Principles of Geology* (1830–1833), Darwin encountered the uniformity principle in its most radical form, that of a steady-state world.[9] Second, by reading William Paley's *Natural Theology* (1802), Darwin was exposed to the design argument applied to the living world in its most classic and traditional presentation.[10] Sitting atop his century, Darwin received more than pale echoes from the combined influences of the Scientific Revolution and natural theology. This is not to say that Darwin applied concepts of previous centuries as such; rather, I hold that they formed part of his intellectual baggage when he elaborated his transmutation theory. One fundamental notion around which these concepts are organized will occupy us for the rest of this paper: the notion that the world is a fully constituted place created full-fledged and essentially complete. I argue that it was Darwin's challenge, or original contribution, to find a way to 'loosen up' this notion devised for a static world in order to allow for some kind of evolutionary change.

A fully constituted world

Envisioning the world in analogy with a machine presupposes a cluster of overlapping and mutually reinforcing concepts (listed above). Let us be more specific by detailing the ideas implicated by these concepts:

(1) The world is a single and unified entity or system.
(2) The world is not empty. Rather, it is filled with the necessary constitutive parts that make it 'go round'. In some conceptions of the world, the parts are believed to be continuous and contiguous.
(3) The world is permanent in the sense that it has no beginning and no end beyond its current state. By definition, half a machine is no machine at all. There may be a before or an after for a machine, but during its functional existence a machine has to be equal to itself at all times; it thus has no past and no future, since in its unbroken or functional state it can only be more of the same. The notion of actualism (see below) is inherent to this complete and permanent world.
(4) The world is held together by the principle of uniformity: the quality or state of being uniform, regular, unvarying, through the effect of laws and processes now in operation thought to be the same everywhere and for all eternity (past, present, future). The notion of gradualism (see below) is complementary to uniformity. The principle of uniformity can sometimes also be extended to cover entities believed to be identical, homogeneous, lacking in diversity or variation.

The question of the beginning of the world was a non-starter for scholars believing in a fully constituted world. In such a world, the state beyond the current one becomes irrelevant if only because two options are conceivable:

[5] H. Floris Cohen, *The Scientific Revolution: A Historiographical Inquiry* (Chicago, 1994); Marcus Hellyer, 'Editor's Introduction: What Was the Scientific Revolution?', in M. Hellyer (ed.), *The Scientific Revolution: The Essential Readings* (Oxford, 2003), 1–15; Margaret Osler, 'The Canonical Imperative: Rethinking the Scientific Revolution', in M. Osler (ed.), *Rethinking the Scientific Revolution* (Cambridge, 2000), 3–22; John Schuster, 'The Scientific Revolution', in R. Olby, G. Cantor, J. Christie, and J. Hodge (eds), *Companion to the History of Modern Science* (London, 1990), 217–242; Steven Shapin, *The Scientific Revolution* (Chicago, 1996).

[6] Edwin Burtt, *The Metaphysical Foundations of Modern Physical Science* (London, 1924); Alexandre Koyré, *Études galiléennes* (Paris, 1939); Herbert Butterfield, *The Origins of Modern Science, 1300–1800* (London, 1949); A. Rupert Hall, *The Scientific Revolution, 1500–1800* (London, 1954); Eduard Dijksterhuis, *The Mechanization of the World Picture* (Oxford, 1961); Thomas Kuhn, 'Mathematical Versus Experimental Traditions in the Development of Physical Science', *Journal of Interdisciplinary History*, 7 (1976), 1–31; Richard Westfall, *The Construction of Modern Science: Mechanisms and Mechanics* (Cambridge, 1977).

[7] John Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge, 1991), 117–151.

[8] Robin Collingwood, *The Idea of Nature* (Oxford, 1945), 5, 14; John Greene, *Science, Ideology, and World View: Essays in the History of Evolutionary Ideas* (Berkeley, 1981), 11–14, 33, 44.

[9] Jonathan Hodge, 'Darwin and the Laws of the Animate Part of the Terrestrial System (1835–1837): On the Lyellian Origins of His Zoonomical Explanatory Program', *Studies in History of Biology*, 6 (1982), 1–106.

[10] Michael Ruse, *Darwin and Design* (Cambridge, 2003), 110.