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CHAPTER X

Darwin — A Christian Undermining Christianity? On Self-Undermining Dynamics of Ideas between Belief and Science

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The relationship between science and belief in Charles Darwin's thought is much more intricate than one might assume solely on the basis of a general conflict between science and belief. In this article, I would like to give an account which makes the interplay of ideas—both positive and negative—between scientific and religious thought in Darwin's philosophy intelligible, by providing evidence that there is a self-undermining dynamics of ideas between belief and science.

The starting point for my discussion is to consider how Darwin's particular theory of evolution was inspired by the tenets of a secularised standpoint and even a manifestly religious background. Secondly, a consideration is given of how 'Darwinism' then undermined its author's former Christian world-view, on which it was partly based. Thirdly, I raise the question of how the resulting undermining of Darwin's religious views, in turn, contributed or allowed modifications to his biological theory. Finally, the dynamics of self-undermining ideas between belief and science is briefly considered in the context of a general understanding of the history of science.¹

¹ The so-called 'Darwin industry' provides rich sources for researching every minutiae of Darwin's life and intellectual development. The following abbreviations have been used: ACD = N. Barlow (ed.), *The Autobiography of Charles Darwin 1809-1882. With original omissions restored*, New York, 1958 (written: 1876). CCCD = F. Burkhard et al. (ed.), *A Calendar of the Correspondence of Charles Darwin, 1821-1882*, Cambridge, 1994, 2nd ed. CCD = F. Burkhard et al. (ed.) *The Correspondence of Charles Darwin*, Cambridge, 1985-. CDN = P. H. Barrett et al. (ed.) *Charles Darwin's Notebooks, 1836-1844*, Cambridge, 1987. CDOS = M. Peckham (ed.), *The Origin of Species: A Variorum Text*, Philadelphia, 1959 (orig.: 1859, 1860, 1861, 1866, 1869, 1872). LLCD = F. Darwin (ed.), *Life and Letters of Charles Darwin*, 1897; reprinted in: *The Works of Charles Darwin*, Vol. 17, Vol. 18, New York, 1972. WCD = P. H. Barrett et. al. (ed.) *The Works of Charles Darwin*, London, 1986-1989.

1. From Natural Theology to Natural Selection

Darwin's theory of evolution is itself not a *creatio ex nihilo*, but one of the greatest empirical and also theoretical syntheses known in the history of ideas. The theoretical aspects of this synthesis are not exclusively based on scientific ideas but, despite the resulting anti-religious inclinations, on religious ones as well.

Charles Darwin was born into a wealthy family of intermarrying Darwins and Wedgwoods. This family had been influenced by Unitarianism, which can be characterised by a critical attitude towards the Trinity, but also a firm belief that God's benevolence is expressed in the material world.² Accordingly, the young Charles was more interested in the varieties of God's material creation than in the interpretation of the Gospels. Nonetheless, when he was preparing to study at Cambridge, where he intended to become ordained as an Anglican priest, Charles clearly—and perhaps naively—, believed in God. After reading John Bird Sumner's *Evidences of Christianity*, he noted that there was 'no other way except by [Jesus'] divinity' of explaining the historical evidence provided by the Gospels.³ Later, Darwin went on to write in his *Autobiography*, 'I did not then in the least doubt the strict and literal truth of every word in the bible'.⁴

I would like, at this stage, to consider three of the main influences on Darwin's biological theory which had a direct or indirect religious origin: Paley's belief in the divine design of nature, secondly, the conviction that God rules by laws which are eternal, universal and unchangeable, and, finally, Malthus' principle of population, partly presented as a theodicy.⁵

² Charles Darwin's maternal grandfather, the pottery patriarch Josiah Wedgwood was a convinced Unitarian and member of the Lunar Society. He maintained close contact with the chemist and influential Unitarian Joseph Priestley (1733-1804). Hence, Josiah appointed a Unitarian minister for his own school. Charles Darwin's paternal grandfather Erasmus Darwin, also a dissenter, sent his son Robert (Charles' father) to this school. Also, Charles' mother, Susanna Wedgwood, was educated there. Though Charles himself intended to enter the Church of England, he was first sent to a day-school in Shrewsbury, run by the minister of a Unitarian Chapel (ACD, comment of F. Darwin, 22). Darwin's early Unitarian piety was encouraged by his sisters Catherine and Caroline (cf. their letter to Charles: LLCD, Vol. 1, 11th April 1826).

³ A. Desmond, J. Moore, *Darwin*, London, 1992/1991, Ch. 1, 8 f. and Ch 4, 48 f.

⁴ ACD (1876), 57. On board the HMS Beagle, Darwin still believed in the immutability of species and 'was quite orthodox'. He remembered being laughed at by some of the officers, 'for quoting the Bible as an unanswerable authority on some point of morality'. (ACD, 85).

⁵ The significance of natural theology in establishing a framework for Darwin's biological theory was first stressed by W. F. Cannon in 'The Bases of Darwin's Achievement: a Reevaluation', *Victorian Studies*, IV, 1961, 109-34, esp.: 127-30. Subsequently, Paley's influence on Darwin has been acknowledged, in particular by: J. H. Brooke, 'The Relations Between Darwin's Science and his Religion', 40-75, in J. Durant,

1.1 Darwin's early belief in divine design and its relation to his later pan-adaptationism

The concept of perfect adaptation and divine design in nature, as developed particularly in William Paley's (1743-1805) *Natural Theology*, was the religious basis for Darwin's early pan-adaptationism.

At Cambridge, Darwin occupied the same room at Christ College as had Paley.⁶ Darwin was formally required to read Paley's *Evidences of Christianity* and *Principles of Moral and Political Philosophy* for his BA degree. He learned the *Evidences* by heart and answered all of the questions on Paley particularly well. Moreover, Darwin, who was basically not a very ambitious student, read Paley's *Natural Theology* voluntarily and with delight.⁷ He also knew the *Natural Theology* almost by heart⁸ and read it repeatedly, even after he had passed his exams. In the late 1820s and early 1830s, England's natural theology was still in bloom; in particular, in the natural sciences community at Cambridge, amongst which the young Darwin spent most of his time and where he became imbued with thoughts from Paley's *Natural Theology*.⁹ Even later, Darwin wrote in a letter that he, 'hardly ever admired a book more than Paley's *Natural Theology*'⁸, and that the careful study of Paley's works was the only part of his academic course at Cambridge which left a permanent impression on him.¹⁰

Paley considered there to be two sources for collecting evidence for the existence and attributes of the Deity. Firstly, there were the Scriptures, which he treated in his *Evidences of Christianity* as witnessing the literal historical truth of Christian miracles. Secondly, there were the 'designs and dispositions from his [the Creator's] works; or, as we normally call it, the light of nature', which he treated in his *Natural Theology*.¹¹ Paley's *Natural Theology* was particularly

Darwinism and Divinity, Oxford, 1985; D. Ospovat, *The Development of Darwin's Theory; Natural History, Natural Theology and Natural Selection, 1838-1859*, Cambridge, 1995/1981; R. Young, 'Darwin's metaphor: Does nature select?', *The Monist*, 1971/1985, sec. IV-VI.

The account given here is similar to Brooke's account, since he has also stressed that there are both positive as well negative interactions of scientific and religious ideas in Darwin's thought. Additionally, I intend to place these interactions in a temporal order of a dynamic of self-undermining ideas between belief and science.

⁶ A. Desmond, J. Moore (1992/1991), 63-64; cf. LLCD (1887), Vol. 1, Ch. IV, 139; CCD, Vol. 1, 70-71.

⁷ ACD, 59; CCD, Vol. 1, 75; CCD, Vol. 1, 112.

⁸ CCD, Vol. 7, Letter to J. Lubbock, 22nd Nov. 1859, 388.

⁹ Cf.: A. Fyfe, 'The Reception of William Paley's 'Natural Theology' at the University of Cambridge', *British J. for the History of Science*, (1997), esp. 321, 329 f., 335.

¹⁰ ACD, 59.

¹¹ Cf. already W. Paley, *The Principles of Moral and Political Philosophy*, first: 1785, Ch. IV, in *The Works of William Paley, D.D.*, Edinburgh, 1842.

important for Darwin, who also worked on the ‘book of nature’. The argument in Paley’s *Natural Theology* runs from perfect adaptation or design in nature to the existence of God as an omniscient, divine Designer. Paley argued that the mechanical design of a watch found on a heath would testify to the existence of an artificer. By analogy, the perfect design found in nature, found for instance in the complex function of an eye, which Paley conceived along mechanical lines, proved the existence of an omniscient Designer.¹² Also, Paley’s proof of the benevolence of that Deity hinges on the idea of perfect adaptation. Since Paley understood adaptations at the individual level to be ‘beneficial’, and since he observed adaptations mainly at the individual level, he was able to conclude that, ‘in a vast plurality of instances in which contrivance is perceived, the design of the contrivance is beneficial’.¹³

The young Darwin found the ‘argument of design in nature, as given by Paley, [...] conclusive’.¹⁴ Even when Darwin became convinced of the transformation of species in 1837 — like his grandfather Erasmus long before — and adopted his particular theory of evolution in 1838, he retained the Paleyian belief in universal adaptation.¹⁵ In 1842, he suggested, in the first full sketch of his theory, that the secondary law of natural selection, which was ‘impressed on matter by the Creator’, was capable of ‘creating individual organisms, each characterised by the most exquisite workmanship and widely-extended adaptations.’¹⁶ Ospovat has argued that Darwin continued to believe in the Paleyian tenet that organisms are perfectly adapted after 1838 until at least 1844, and, only partly modified, at least until 1859.¹⁷ In 1857, when Darwin confessed his theory to Asa Gray in a letter, he wrote—with obviously religious overtones—of ‘a being’ selecting for one end,

¹² W. Paley, *Natural Theology[, or Evidences of the Existence and Attributes of the Deity Collected from the Appearances of Nature]*, first: 1802, in *Works of William Paley*, 1842. Particularly: Ch. I, V, XXIII, on the attributes of the Deity: Ch. XXIII-XXVI.

¹³ W. Paley, (1802), Ch. XXVI, the first of the two propositions. Also W. Paley (1785), Chapter V. Also Paley’s individualism may have influenced Darwin.

¹⁴ ACD, 87; see also footnotes 8 and 10.

¹⁵ a) The dates of these turning points are largely accepted today: Cf.: CDN, S. Herbert’s introduction to Darwin’s *Red Notebook*, 18, D. Kohn’s introduction to *Notebook D*, 329-330 and note 28th Sep. 1838, orig. 135e. Cf. also ACD, 83, 119-20.

b) I think that e. g. Sloan has correctly pointed out that Darwin’s early concept of transmutation is reminiscent of Erasmus Darwin’s, Schelling’s, Oken’s and Humboldt’s concept of a creative nature. In contrast to Sloan, I would stress that Darwin nevertheless transformed this concept by integrating it into the respectable framework of British natural theology and of Newtonian science. P. R. Sloan. ‘‘The Sense of Sublimity’’—Darwin on Nature and Divinity’, 251-269, in J. Brooke, M. J. Osler, J. M. van der Meer, *Science in Theistic Contexts. Cognitive Dimensions*, Osiis, Vol. 16 (2001).

¹⁶ WCD, Vol. 10, *Sketch* (1842) 51, 52.

¹⁷ D. Ospovat (1981/1995), xv, Ch. 3. Ospovat uses the term ‘perfect adaptation’ for absolute *and* relative adaptation. Moreover, he concedes that even perfect adaptation has its limits (73-4). This does not render Ospovat terminology inadequate, since even Paley concedes the existence of a few imperfections (1802, Ch. V, XXVI).

during millions of generations and of ‘an unerring power at work in Natural Selection [...], which selects exclusively for the good of each’ organism.¹⁸ Also, in the *Origin of Species*, a strong belief in universal adaptation—still with religious or moral reverberations—can be found: ‘What limit can be put to this power, acting during long ages and rigidly scrutinising the whole constitution, structure, and habits of each creature,—favouring the good and rejecting the bad? I can see no limit to this power, in slowly and beautifully adapting each form to the most complex relations of life’.¹⁹ Darwin’s Paleyan belief in universal adaptation to the circumstances of life may also have encouraged him to principally attribute the causes of evolution to an external source, to the environment of the organisms (as opposed to an inner, developmental force favoured by romantic biologists).²⁰ When constructing his theory of evolution, Darwin still hoped that this theory could at least be brought into harmony with a deistic belief in God. Correspondingly, in the resulting theory, organisms are still regarded as being machines that are almost perfectly designed and adapted; although the benevolent omniscient designer, God, had been replaced by the omnipotent process of natural selection.²¹

1.2 *God’s eternal law and Darwin’s process monism*

A second, direct, or at least secularised religious influence on Darwin was the belief in divine and preordained universal laws of nature. In the 1830s, the alliance of religion and the sciences was still largely intact in England, but this alliance had acquired a deistic leaning. Paradoxically, the religious writings of Paley, in particular, gave a justification to Darwin’s persistent search for a mechanical universal law of organic nature.

Paley, even in his early *Moral Philosophy*, had argued in favour of general rules and against a deification of accidents, such as bolts of thunder.²² In a way, this continued the Christian agenda of a demystification of nature, which had

¹⁸ CCD, Vol. 6, 5th Sep. 1857, Appendix, Section 3, see also Section 2.

¹⁹ CDOS (1859), XIV, s. 99-100, also e. g. IV, s. 40.

²⁰ Cf. Paley’s criticism of the ‘absurdity of self-creation’ (1802), Ch. XXIII. For a discussion of the Darwinian (as well as Lamarckian) focus on external causes see: M. von Sydow, *Sociobiology, Universal Darwinism and Their Transcendence*, PhD-Thesis, University of Durham, 2001, 349 f.

²¹ It has been pointed out that *some* uses of the term adaptation or survival of the fittest are tautological in stating the obvious truth of the survival of the survivor. Cf.: St. J. Gould, R. C. Lewontin, ‘The Spandrels of San Marco and the Panglossian Paradigm’, in *Proceedings of the Royal Society of London*, Series B, 205, 1979, 581-598; M. von Sydow (2001), section 9.1.

²² W. Paley (1785), Ch. VII, Ch. VIII.

formerly often been associated with pagan Deities, in all its elements.²³ Even in the *Evidences of Christianity*, in which Paley actually tried to prove the truth of Christian miracles in a literal, historical sense, he rigorously argued *against* the existence of any other supposed miracles.²⁴ Moreover, Paley, in *Natural Theology*, advocated the lawfulness of a mechanical world on theological grounds: a ‘law presupposes an agent’. To Paley, the Book of Nature demonstrated that the Deity was acting according to general laws. Referring especially to Newtonian physics, Paley emphasised that these general laws are immutable, and if ‘a particular purpose is to be effected, it is not by making a new law, [...] but it is [...] by the interposition of an apparatus, corresponding with these laws [...]’.²⁵ According to Paley, knowledge of the attributes of the Deity (like omnipresence, eternity and unity) also rests on empirical evidence of the laws of nature; i. e. their generality, their inability to be changed and uniformity. Paley argued that evidence showed that ‘the laws of nature every where prevail’, that these laws ‘are uniform and universal’. Therefore, Paley continued, these laws refer us to an agent with corresponding attributes—an omnipresent and eternal God. As will become apparent in the next section, even Paley’s defence of the benevolence of God (in spite of the existence of evil) is linked to the concept of God acting in nature by secondary laws.²⁶

Likewise, the creed of preordained, unchangeable laws in nature was preached to Darwin in a rather secularised way. Already in the eighteenth century, the universal laws of motion, as discovered by Newton—a sage for Darwin’s community of natural scientists—had become generally paradigmatic for a sober, deistic belief in God who acts by general and uniform secondary laws. This was the case, even though Newton himself had tried to maintain belief in an omnipotent God who intervenes directly.²⁷ The concept of simple, uniform and inviolable laws of nature was preached to Darwin in a partly secularised way especially by Lyell and Herschel. Even before Darwin adopted his *particular* theory of evolution, he was in search of a universal and fixed law of nature which was analogous to Newton’s universal laws of motion. He wrote in his notebook, ‘Astronomers might formerly have said that God ordered, each planet to move in

²³ The modern concept of nature ruled by universal laws can be understood as a mechanically transformed, Platonic-Christian concept of *machina mundi*, in which mechanical laws of nature have replaced the unchangeable Platonic forms, or ideas of God.

²⁴ W. Paley, *A View of the Evidences of Christianity*, first publ.: 1794, in *The Works of William Paley, D.D.* (1842), proof of proposition 2 of Part I.

²⁵ W. Paley (1802), Ch. I, Sec. VII; Ch. XXIII; similar in Ch. XXV; Ch. III, cf. Ch. XXIII.

²⁶ *Ibid.*, Ch. XXIV, also Ch. XXV, cf. also Ch. XXVI.

²⁷ Newton opposed Descartes’ materialism and even argued that God continuously adjusts the planets preventing their gravitational collapse. In a *Scholium Generale* to the second edition of his *Philosophiae Naturalis Principia Mathematica* (1713) Newton argued that matter is passive and cannot produce gravitation—gravitation is to be attributed to God, the pantocrator (N. Guicciardini, *Newton*, Heidelberg, 1998). Newton, nevertheless, turned against the Aristotelian *causa finalis* and *causa formalis*.

its particular destiny.— In same manner God orders each animal created with certain form in [a] certain country, but how much more simple, & sublime power let attraction act according to certain laws such are inevitable consequen[ce] let animal be created, then by the fixed laws of generation, such will be their successors.—²⁸ In regard to that period, John C. Greene is, in my opinion, right in having called Darwin an ‘evolutionary deist’. Darwin turned against any alternative evolutionary theory based on the concept of a directly intervening God or a *creatio continua* with an almost religious zeal. According to Darwin, the assumption that God would be concerned directly with the ‘long succession of vile Molluscous animals’ is ‘beneath the dignity of him’.²⁹ After reading Malthus’ *Principle of Population*, Darwin thought that this principle provided him with the universal law of evolution which he was searching for and he scribbled in his notebook that, ‘since the world began, the causes of population & depopulation have been probably as constant as any of the laws of nature with which we are acquainted’.³⁰ In his *Sketch* (1842) and his *Essay* (1844), Darwin still continued to argue that the law he had found ‘exalts’ our notion of an omniscient Creator and, even in the *Origin of Species*, his support of a universal law is partly justified in a religious way. In the epigraphs at the beginning of the *Origin*, Whewell’s *Bridgewater Treaties* and Butler’s *Analogy of Religion*, it is, for example, claimed that, in nature, Divine power becomes apparent in the existence of general laws.³¹

Although Darwin, like others before him, broke with the static world view and proposed a theory of evolution, his theory of natural selection itself remained static, in proposing an unchangeable, almost preordained, evolutionary mechanism.³²

1.3 The influence of Malthus’ and Paley’s theodicy

A third main influence on Darwin which had a partly religious underpinning was Thomas Malthus’ principle of population. This struck Darwin as being an explanation of evolution and adaptation. Malthus’ iron principle made a deep impression on Darwin, not only because it provided a mechanistic law appropriate to Newtonian science, differing from the Lamarckian explanation of adaptation and an evolutionary inner *Bildungstrieb*, but also because Rev. Malthus presented his principle as part of a theodicy, similar to the one Darwin knew, in detail, from Paley’s *Natural Theology*.

²⁸ CDN, *Notebook B*, note from 1837, orig. p. 101. D. J. Depew and B. H. Weber in *Darwinism Evolving*, Cambridge (MA), 1995, have shown that Darwin’s concept of natural selection is modelled along Newtonian lines, in an even more profound sense.

²⁹ CDN, *Notebook D*, 16th Aug. 1838, orig. p. 37.

³⁰ CDN, *Notebook E*, presumably 2nd Oct. 1838, orig. p. 3; dated according to D. Kohn.

³¹ WCD, Vol. 10, end of the *Sketch* and *Essay*. CDOS, s. 1; 1.1b; cf. e. g.: XIV, s. 259.

³² For alternative proposals see, e. g. M. von Sydow (2001).

It is generally acknowledged that Darwin got the final inspiration for the first formulation of his specific theory of evolution directly from re-reading Malthus' *An Essay on the Principle of Population* on 28th September 1838.³³ Malthus' principle of population says that human populations always increase much faster than their food supply. Malthus, also a political economist, had used this as an argument against the perfectibility of society, the aspirations of the French revolution and the utopianism of W. Godwin and M. de Condorcet. In explaining evolution by means of scarce resources, a struggle for life and the survival of the fittest, Darwin applied Malthus' principle of population 'with manifold force to the whole animal and vegetable kingdom'.³⁴ Malthus, especially in the first edition of the *Essay on Population*, but also later on, presented his critique of the utopians as a worldly theodicy.³⁵ He emphasised the positive effects of this harsh principle which 'prevents the vices of mankind, or the accidents of nature, the partial evils arising from general laws, from obstructing the high purpose of the creation'. Although the principle of population, according to Malthus, generally had positive effects, 'it is impossible that this law can operate, and produce the effects apparently intended by the supreme Being, without occasioning partial evil'.³⁶ Malthus' theodicy was based on the argument that God acted by universal secondary laws, by the principle of population, and that the resulting harsh conditions for the poor generally had positive effects, in that they checked the growth of population and imposed moral constraints. Thereby, Malthus had reconciled the existence of evil, and even his claim of an *unchangeable* existence of evil, uttered in the first edition of the *Essay*, with that of a benevolent God.

The theodicy of Paley's *Natural Theology* is indeed similar to Malthus' theodicy. Paley, when treating the 'goodness of the Deity', conceded—despite his emphasis on perfection and happiness—that pain, privation and chance exist in numerous instances. Paley's theodicy is also based on the concept of general laws or rules: 'Of the Origin of Evil, no universal solution has been discovered [...]. The most comprehensive is that which arises from the consideration of general rules'.

³³ See Darwin himself: ACD, 120; also, e. g. his *Variation under Domestication*, 1875 (WCD), orig. p. 8. Darwin's Notebooks provide evidence of the date when he adopted a Malthusian approach: CDN, *Notebook D*, orig. p. 134 f.; cf. 678. See also E. Mayr, *The Growth of Biological Thought*, Cambridge (MA), 1982, 477 f., but cf. 491 f.

³⁴ CDOS (1959), Ch. III, s. 36.

³⁵ Th. Malthus, *An Essay on the Principle of Population, as it affects the Future improvement of Society with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers*, first ed., 1798, sixth ed., 1826, in E. A. Wigley et al. (ed.): *The Works of Thomas Malthus*, eight volumes, London, 1986. The presentation as theodicy is particularly striking in the widely-known first edition of 1798. The chapter on natural theology has been dropped in later editions its contents distributed to other parts of the essay (cf.: D. Ospovat 1981/1995, 66). Although Darwin in September reread the sixth edition, he definitely was acquainted with the common interpretation of Malthus' Essay as theodicy.

³⁶ Th. Malthus (1798, first ed.), Chap. XVIII, XIX, 365.

The existence of a benevolent God could only be vindicated if he is acting by general laws, which may lead to partial evil, but whose effects are predominantly good. Moreover, also the Malthusian topic of superfecundity is essential to Paley's theodicy. For Paley the 'system of natural hostilities', e. g. animals preying upon one another, is to be understood 'in strict connection with another property of animal nature, *superfecundity*'. This wastefulness may be justified as being also advantageous. Superfecundity, for Paley, firstly 'tends to keep the world always full; whilst, secondly, it allows the proportion between the several species of animals to be differently modified, as different purposes require, or as different situations may afford for them room and food. [...] Farther; by virtue of this same super-fecundity, what we term destruction, becomes almost instantly the parent of life". Also, in relation to mankind, Paley explicitly took a Malthusian standpoint. For Paley, as for Malthus, the harsh conditions of the poor do not constitute arguments against God, rather they show that the world is in a 'state of probation' 'calculated for the production, exercise, and improvement of moral qualities, with a view to a future state'. Furthermore, Paley repeatedly stressed that there may have been some further consequences of the 'system of natural hostilities' hidden from us; and because of the benevolence which pervades on his account the general design of nature, we ought to presume that 'these consequences, if they would enter into our calculation, would turn the balance on the favourable side'.³⁷

From here it was not very far to Darwin's idea that the evolution of higher organisms—which he already took for granted—may justify superfecundity. When Darwin transformed static Malthusianism into a general evolutionary theory, he had found the very component which Paley had not; namely, a proper 'final cause' of superfecundity and struggle in nature, in which the final cause 'must be to sort out proper structure & adapt it to change'.³⁸ Although Darwin soon dropped notions like 'final cause', he maintained aspects of a worldly theodicy in later writings. In his *Sketch* (1842), Darwin wrote, 'From death, famine, rapine, and the concealed war of nature we can see that the highest good, which we can conceive, the creation of the higher animals has directly come'. In this passage, Darwin then praises an omniscient Creator, acting by the secondary law of natural selection.³⁹ The argument that the positive consequences of natural selection outweigh the negative ones is still, to some extent, to be found in the *Origin of Species*.⁴⁰

Nevertheless, some discontinuities between the theodicies of Paley and Malthus and the secularised theodicy of Darwin remain. As has been noted by Bowler, even Malthus, who justified and demanded harsh conditions for the poor, did not favour the differential elimination of the unfit. Malthus intended to

³⁷ W. Paley (1802), second half of Chap. XXVI.

³⁸ CDN, *Notebook D*, 28th Sep. 1838, orig. p. 135e.

³⁹ WCD, Vol. 10, End of the *Sketch* (1842), 51-52 (similar to the *Essay*, 1844).

⁴⁰ At the end of the *Origin of Species* (1959, CDOS), the argument of the *Sketch* and *Essay* is repeated. Ch. XIV, 269-70; Chap. III, s. 165.

encourage 'slothful mankind' to work.⁴¹ Darwin's resulting theory of natural selection, however, focused even less on the betterment of unfit organisms and more on their elimination.⁴² Despite this change, the term 'natural selection' in Darwin's theory still mirrors the imagery of God's 'invisible hand'.

2. Darwin's biological theory undermines the Christian foundation on which his scientific theory had partly been based

Although Darwin's biological theory of pan-adaptationism and of an unchangeable law of natural selection was based on Paley's natural theology, it nevertheless became a main cause for Darwin's loss of faith. Darwin successively lost his belief in divine revelation, his confidence in a Paleyan benign conception of nature and, finally, even a belief in deism. Instead, he came to advocate a world view based on a remorseless struggle for life and one which offered no hand outstretched to the losers.

Darwin had involuntarily proposed a rather diabolic 'principle of conservation of blindness, cruelty and wastefulness' that was reminiscent of Malthus, 'To prevent the recurrence of misery, is, alas! Beyond the power of man'.⁴³ In a view which stresses the unchangeable blindness of evolution, it appears absurd to regard God as omnipotent, possessing foresight and benevolence; he at best appears to be a 'blind watchmaker'.⁴⁴ In his search for certain, eternal and ubiquitous 'laws of harmony',⁴⁵ Darwin finally proposed the Law of Natural Selection. Harmony became metaphysically based on and explained by an unchangeably cruel and wasteful struggle for life. In this light, the Christian credo 'As it was in the beginning, it is now, and ever shall be: world without end' (*Gloria*) cannot sound as hopeful as it sounded before.⁴⁶

It is difficult to trace the actual development of Darwin's religious views, since he, unlike some of his companions, remained reticent on religion and his crisis of faith. He was himself unwilling to give up his belief and did not want to evoke more dismay than necessary in public or in his pious wife, Emma.⁴⁷ In one of his

⁴¹ P. J. Bowler, 'Malthus, Darwin and the Concept of Struggle', in *Journal of the History of Ideas*, 1976, 37 (4), 631-650; Bowler, *Charles Darwin*, Oxford, 1990, 82-4.

⁴² This is, however, less clear with regard to Darwin's early *Sketch* (1842) and *Essay* (1844) of his theory, according to which the environment triggers variation.

⁴³ Th. R. Malthus (1798), 98.

⁴⁴ R. Dawkins, *The Blind Watchmaker*, London, 1991/1986.

⁴⁵ Ch. Darwin: CDN, 16th Aug. 1838. *Notebook D* (ed. by D. Kohn, 1987), orig. p. 36.

⁴⁶ This section draws on M. v. Sydow (2001), 33-6, 182-4.

⁴⁷ a) ACD (1876), 86, but 87, cf. e. g. CCD, Vol 8, Letter to A. Gray, 22nd May [1860], 224; b) LLCDC, Vol. 1, Chap. VIII, F. Darwin comments on p. 276; letter to F. E. Abbot, 6th Sept. 1871, 277; letter to E. Aveling 13th Oct. 1880 mentioned in CCCD, 12757 and quoted in R Young (1971/1985), 20-21, 251. Cf. Young's conclusion, 21.

private notebooks, he explicitly advised himself to ‘avoid stating how far, I believe, in materialism’.⁴⁸ Therefore, the development of Darwin’s religious views has to be reconstructed from his private notebooks, his letters and his restored, relatively frank, *Autobiography*, which was intended for family use only.⁴⁹

Considering these sources, Darwin obviously had difficulties in coming to terms with the materialist and atheist tendencies of his own explanation of evolution. In an early notebook, he wrote: ‘love of deity [is the] effect of organisation. oh you Materialist!’.⁵⁰ This early self characterisation would turn out to be truer than he could have foreseen at the time. I will now trace how Darwin first lost faith in divine revelation, then his belief in deism, and how he finally came to regard himself (at least) as an agnostic.

Darwin himself stated in his private autobiography that he had gradually come ‘to disbelieve in Christianity as a divine revelation’.⁵¹ Darwin’s early ‘Paleyite Anglicanism, steeped in Unitarian nonconformity’⁵² had been almost naively empirical in character and, correspondingly, his disbelief in the truth of the bible seems to have been mainly the result of empirical considerations. In Paley’s *Evidences of Christianity*, the main arguments for divine revelation is empirical evidence for the literal historical truth of Christian miracles. An empirical literal understanding of the Bible, as opposed to a more metaphysical or symbolic one, was particularly susceptible to historical biblical criticism. The theological approach of Paley, particularly in his *Natural Theology*, is a characteristic product of the empiricist tradition.⁵³ Moreover, Paley, both in the *Evidences* and in his *Natural Theology*, demonstrates that there was no substantial evidence in favour of any non-biblical miracle and that nature was generally governed by laws. Darwin, as a naturalist, aimed to support these claims by showing that the organic world is

⁴⁸ CDN, *Notebook M*, orig. p. 57; CCCD, Letter to J. D. Hooker. 8th Sept. 1868, 6342 (cf. also: F. Darwin et al., ed., *More Letters of Charles Darwin*). Darwin’s public attitude that a strict distinction between science and faith is most appropriate, appears to be due to his view that nothing good could result from connecting these domains of thought (cf. CCCD, 3208, 11766, 12931, 12088).

⁴⁹ See footnote 1. Darwin’s *Autobiography* was originally named *Recollections of the Development of my mind and character*. After Charles Darwin’s death Francis Darwin, Charles son, edited the *Autobiography*, but purged it from offending passages (LLCD, Vol. 1, Ch. 1, 8). The omissions have been restored in an edition of Charles’ granddaughter Nora Barlow (ACD, 21-145).

⁵⁰ CDN, *Notebook C*, 1838, orig. p. 166. Cf. also later e. g.: *Notebook M*, orig. p. 136; ACD (1876), 93; LLCD, Chap. VIII, letter to Graham, 3rd July 1881.

⁵¹ ACD (1876), 86. Similar: CCD, Vol. 9, letter to B. J. Sullivan, 24th May [1861], 138. Letter to N. A. v. Mengden, 5th June 1879, in CCCD 12088.

⁵² J. Moore, ‘Of love and death: Why Darwin ‘gave up Christianity’’, 195-229 in J. R. Moore (ed.), *History, Humanity and Evolution. Essays for John C. Greene*, Cambridge, 1989, 196.

⁵³ M. D. Eddy, ‘The Rhetoric and Science of William Paley’s *Natural Theology*’, *Literature and Theology* (forthcoming).

also governed by law. But, ironically, this ended up undermining his own belief in *any* miracles: ‘the more we know of the fixed laws of nature the more incredible do miracles become’⁵⁴.

Subsequently, Darwin came to the conclusion that the argument from design in nature, as given by Paley, also ‘fails, now that the law of natural selection has been discovered’.⁵⁵ Design or adaptation of organisms is explained by the laws of evolution. At first, Darwin still hoped that Paley’s argument from design would remain successful in regard to the *laws* of nature—which do not themselves evolve.⁵⁶ But, only for a brief period did Darwin’s deism become ‘a featherbed to catch a falling Christian’.⁵⁷ Darwin soon came to see that there ‘seems to be no more design in variability of organic beings and in the action of natural selection, than in the course which the wind blows’. Darwin, apparently forced by his own theory, rejected his former belief that the ‘existence of so-called natural laws implies purpose’.⁵⁸ If the world is essentially a ‘struggle for existence’ or a ‘war of nature’⁵⁹, if harmony is universally based on conflict, then a Creator—as understood on the basis of his Creation—does not appear to be a merciful benevolent Deity, but rather an evil Demiurge or a Demon, whose views rest upon misery.⁶⁰ Descartes’ hypothetical deceitful demon appears to be harmless in comparison. Darwin indeed castigated himself as a ‘Devil’s Chaplain’, ‘writing on the clumsy, wasteful, blundering law & horrible cruel works of nature’.⁶¹ Working through the consequences of his theory even gave Darwin migraines.⁶² Darwin, when describing his loss of a benign view of nature, confessed that he also had become, so to speak, colour-blind even to grand scenes of natural beauty, which formerly had made an overwhelming impression on him.⁶³ Darwin’s ideas on religion nevertheless fluctuated and, when writing the *Origin*, he still hoped that an argument similar to Paley’s and Malthus’ theodicy would remain viable. He thought that maybe God as *prima causa* could be justified if happiness decidedly prevailed over suffering.⁶⁴ But Darwin also became increasingly less convinced of this point: ‘I cannot see, as plainly as others do, & as I sh^d wish to do, evidence of design & beneficence on all sides of us. There seems to me too much misery in the

⁵⁴ ACD (1876), 86.

⁵⁵ ACD (1876), 87, cf. Darwin’s disputes with Gray and Lyell on divine forethought, CCD.

⁵⁶ cf. ACD (1876), 87-90, 92-3.

⁵⁷ Cf.: A. Desmond, J. Moore (1991), Ch. 1, 256; J. Moore (1989), 209, 216, 221.

⁵⁸ ACD (1876), 87; LLCd, Ch. VIII, Letter to Graham, 3rd July 1881; cf. WCD, *Variation under Domestication* (1875), 426-8.

⁵⁹ CDOS, heading of Ch. III; Ch. III, s. 145; Ch. IV, 10, 393; Ch III, 165; Ch. XIV, 296.

⁶⁰ Cf. e. g.: R. Dawkins, *River out of Eden*, London, 1995/1988, 109.

⁶¹ Cf. J. Moore (1989), 222. A. Desmond, J. Moore (1991), xvi, cf. also 41, 281, 287, 354, 516, 519, 524, 531; 73, 677; cf. e. g. CDOS, Ch. VI, 241.

⁶² See already N. Barlow, *Charles Darwin’s Ill-Health* (1958), in ACD, 240-243.

⁶³ ACD, 91, 44, 138.

⁶⁴ CDOS (variorum edition), Ch. III, s. 165, Ch. XIV, s. 269.

world.’⁶⁵ Darwin’s former belief in the ultimate justice and benevolence apparent in the laws of nature was additionally challenged by the death of his favourite daughter, Annie.⁶⁶ In his *unexpurgated* Autobiography, Darwin—although still wavering—conceded that the ‘old argument from the existence of suffering against the existence of an intelligent first cause seems to me a strong one; whereas [...] the presence of much suffering agrees well with that all organic beings have been developed through variation and natural selection’.⁶⁷

After all of these struggles, even Darwin’s autobiography, which was also intended for Emma, reveals that, by 1876, he had lost at least any firm belief in an omniscient benevolent God and called himself an agnostic.⁶⁸ Although Darwin differed from most anti-religious thinkers in not taking any pleasure in reviling religion, Professor Ghiselin’s remark that ‘an agnostic is an atheist with children’ appears to fit well here—‘and a pious wife’ is all I add to it.⁶⁹

Darwin’s pious transformation of natural theology into natural selection had finally undermined his previous firm belief in Christianity.

3. The possibility of biological compromises based on lost religious grounds

As it no longer appeared possible to associate ‘natural selection’ with the invisible hand of a good, omniscient deity and the paradise-like Paleyan harmony of nature, Darwin’s biological concept of the universality of natural selection and adaptation became weakened. Nevertheless, while Darwin’s religious beliefs withered, he became increasingly free to modify his biological approach, which was still the object of strong scientific and public criticism, anyway.⁷⁰ Moreover,

⁶⁵ CCD, Vol. 8, Letter to Asa Gray, 22nd May [1860], 224.

⁶⁶ J. Moore (1989, 216-220, 223) lays more stress on these personal reasons for Darwin’s loss of faith. Also: J. H. Brooke, ‘Darwin and Victorian Christian Christianity’, in: J. Hodge, G. Radick, *Cambridge Companion to Darwin*, Cambridge, 2003, 199-202.

⁶⁷ ACD, 90, cf. 88-89.

⁶⁸ ACD, 94; Letter to J. Fordyce, 7th May 1879, in: CCCD, 12041, or LLCD, Vol. 1, Chap. VIII, 274. But cf. also B. Lightman, ‘Huxley and scientific agnosticism’, *British Journal for the History of Science*, 2002, **35** (3), 271-289.

⁶⁹ Private discussion with Professor M. Ghiselin at a conference on *Naturphilosophie nach Schelling* at the University of Jena, Nov. 2002. Cf. also ACD, 93 and LLCD, Vol. 1, 286: F. Darwin mentions that Dr. Aveling presents ‘quite fairly’ his father’s views by stating that the terms ‘agnostic’ and ‘atheist’ were practically equivalent and agnostics only expressed disbelief in a much less aggressive way.

⁷⁰ R. Owen, G. D. Campbell (Duke of Argyll), G. Mivart, S. Butler and W. Thompson (Lord Kelvin) were untiring in pointing out problematic aspects of Darwin’s theory. Also friends and supporters of Darwin, like A. Gray, C. Lyell, E. Haeckel and even T. H. Huxley and A. R. Wallace were far from advocating pure Darwinian dogma. P. Bowler, *The Non-Darwinian Revolution*, Baltimore (MD), 1988, esp. 5, 16, 76 f., 105-7, 175. Also Bowler (1990), e. g. 81, 155-61, 166.

as Darwin uncompromisingly had aimed to apply his theory of natural selection to the *Descent of Man*, he, an exceptionally humane man, was apparently shaken by the concept of a ‘remorseless struggle’.

Although still advocating individual natural selection as the main force of evolution, by the time he wrote the *Decent of Man*, Darwin gave more room to sexual selection, group selection, correlation of growth and use or disuse. He explicitly conceded that he ‘perhaps attributed too much to the action of natural selection or the survival of the fittest’ and overestimated the omnipresence of adaptation.⁷¹ Correspondingly, Darwin also altered the fifth and sixth edition of the *Origin*.⁷²

With regard to his earlier pan-adaptationism, Darwin conceded in the *Descent of Man* that he ‘did not formerly consider sufficiently the existence of structures, which, as far as we can at present judge, are neither beneficial nor injurious, and this I believe to be one of the greatest oversights as yet detected in my work’. He himself attributed his former bias in adopting a pan-adaptationist view of nature to his earlier belief in natural theology: ‘I was not, however, able to annul the influence of my former belief, then almost universal, that each species had been purposely created; and this led to my tacit assumption that every detail of structure, excepting rudiments, was of some special, though unrecognised, service’.

With regard to the universality of natural selection, Darwin conceded, after referring to Paley’s influences on his thoughts, that anyone with the assumptions influenced by theology he had had in mind, would ‘naturally extend too far the action of natural selection [...]’.⁷³

4. On the self-undermining dynamics of ideas between belief and science in the history of ideas

If my abridged account of the development of Darwin’s thought in relation to belief and science is correct, it may shed light on the more general understanding of the history of ideas. Taking the example given here, it can be seen that science and belief are neither uncoupled nor simply in opposition, but are interwoven, mutually influencing and undermining each other and, indirectly, even undermine themselves. From this point of view, Darwinism is neither a particular form of ‘Christian’ nor of ‘anti-Christian biology’, but—paradoxically—both. This essay

⁷¹ WCD, *Descent of Man* (1877), Ch. II, orig. p. 61, cf. footnote 73.

⁷² CDOS, e. g. Ch. I, 322:f; Ch. III, 3:e; Ch. IV, 95.14:e, f, 220:f; Ch. XIV, 183:e, f, 183.0.0.1:f.

⁷³ WCD, *Descent of Man* (1877), Ch. II, orig. p. 61; cf. also orig. pp. v, 30 f., 57. Although Darwin allows for more causal pluralism, he still seems to emphasise that the ‘so-called laws apply equally to man and the lower animals; and most of them even to plants’, orig. p. 30.

shows how the inconsistency of accounts that stress either co-operation or conflict in Darwin's scientific and religious ideas can be resolved by understanding Darwin's intellectual development as a dynamic processes in which there was a self-undermining of ideas.

Moreover, this case study of the eminent scientist Charles Darwin demonstrates the inadequacy or incompleteness of conventional understandings in the history of science. I would like to mention a few, potential historiographic implications deriving from the account given.

Firstly, the account is at odds with approaches exclusively based on empiricism, positivism and internalism. Without intending to deny the relevance of Darwin's empirical investigations to his theoretical achievements, it has been shown that the construction of his theory also essentially hinges on religious or metaphysical tenets. This is consonant with the fact that Darwin did not adopt his theory of natural selection while staying on the Galapagos Islands, but when he was crystallising his impressions or his *protocol sentences* in the light of the available generalisations of that time.⁷⁴ I have shown that Darwin built his specific theory of evolution based on metaphysical tenets, which initially appeared to him to have a strong ethical and religious appeal. Moreover, it has been shown that Darwin's resulting loss of faith, in turn, enabled him to modify his former biological theory. In pursuing an view of science which also considers metaphysical and religious aspects, I have advanced a historiographic position which has been influenced by the works of Professor Dr. David Knight, in whose honour this anthology was written, 'Science is, and always was, based on a judicious mixture of empiricism and faith'⁷⁵.

Secondly, my account differs from approaches that regard ideas and metaphysical aspects of theories as epiphenomenal superstructures based exclusively on the egoistic interests of the holder of the ideas. Nonetheless, in my opinion, socio-economic conditions and interests may well play an important role in the history of science. The political background of Darwin, a Whig, may indeed have driven him to adopt his Malthusian explanation of evolution and to make nature an ally of the Victorian middle classes and their interest in a society based on free competition.⁷⁶ But, this is not the whole story. I have shown that the dynamics of self-undermining ideas was *also* important in the development of

⁷⁴ At least since Hume, it has become apparent that generalisations—by definition—transcend the empirically given. I have treated the problem of induction elsewhere. Without following Popper in his denial of any positive solution of the problem of induction, I also regard generalisations as empirically under-determined and laden with theory.

⁷⁵ D. M. Knight, *The Age of Science: the Scientific World-View in the Nineteenth Century*, Oxford, New York, 1986, 70.

⁷⁶ A. Desmond, J. Moore (1992/1991), particularly 414; A. Desmond, *The Politics of Evolution*, London, Chicago, 1989.

Darwin's thought. The end result was that he was forced to give up ideas which he would formerly liked to have maintained. This, I think, supports the view of the historian J. C. Greene, who once said, 'I still believe that, in some sense, human beings transcend nature. If ideas are only manifestations of a class interest or libidinal drives, then the whole intellectual enterprise is reduced to absurdity.'⁷⁷

Thirdly, the above account differs from the approach of Kuhn, who holds the view that paradigms are largely incommensurable and disconnected. Because of this, Kuhn has been accused of assigning fundamental theoretical change to the irrational.⁷⁸ Although this case study follows Kuhn in stressing the importance of fundamental metaphysical changes, at a biographical level, here it has been shown that the succeeding 'paradigms' in Darwin's intellectual development were nevertheless closely, and in some sense rationally, connected.

Finally, the account given here contrasts with K. R. Popper's, D. T. Campbell's, S. Toulmin's and D. L. Hull's approach, which holds that the development of science is due to self-preserving ideas in a process which is one of mere trial and error of conjecture and refutation.⁷⁹ Instead, it has been shown that a synthesis of ideas can gain tendencies lacking in those ideas themselves, that the dynamics of ideas follow an inner logic, and that ideas may even undermine themselves.

The view suggested in this article concerning the importance of the structural dynamics of ideas bridging belief and science, in which ideas even rationally undermine themselves, in some respects appears to resemble the concept stemming from antiquity of an emanating, developing and rationally unfolding *logos*, which—perhaps—in other words may be expressed as the unfolding of a rational spirit.

5. Recommended Reading List

Bowler, P. J., *Charles Darwin: the Man and His Influence*. Science Biog., gen. ed.: D. Knight (Oxford, 1990).

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⁷⁷ J. C. Greene, Introductory Conversation in J. R. Moore (ed.), *History, Humanity and Evolution. Essays for John C. Greene*, Cambridge etc., 1989, 10, cf. 11. Cf. J. C. Greene, *Science, Ideology, and World View*, Berkeley etc., 1981, 1-2.

⁷⁸ Cf. Th. Kuhn, *Die Struktur wissenschaftlicher Revolutionen*, orig.: *The Structure of Scientific Revolutions*, Frankfurt a. M. 1991/1962, e. g. 19, 116.

⁷⁹ K. R. Popper, *Objective Knowledge. An Evolutionary Approach*, Oxford etc., 1972/1979; D. L. Hull, *The Metaphysics of Evolution*, Chicago 1988. For further developments of 'process-Darwinism' and its critique e. g.: M. v. Sydow (2001).

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