S & CB (2023), **35**, 7 0954–4194

DAVID BROWN

Theodosius Dobzhansky: Paul Tillich, Russian Orthodoxy and Conjunctive Explanations

Theodosius Dobzhansky is undoubtedly one of the most important biologists of the twentieth century. Not only is his contribution to genetics beyond valuation, he actively engaged in religion and science debates, and he is just as likely to be cited in relation to religious interpretations of evolution as he is genetics. While the influence of Teilhard de Chardin on Dobzhansky is widely acknowledged, the role that Eastern Orthodoxy and Paul Tillich played in his religious thought are mysteriously absent from discussions of Dobzhansky's thought, which should strike one as odd given his self-identification with Orthodoxy and the use of Tillich's idea of 'ultimate concern' in his one book length treatise of religion and science, Biology of Ultimate Concern. This paper will therefore explore to what extent Eastern Orthodox themes and the theology of Paul Tillich can contribute to a fuller appreciation of how Dobzhansky understood evolution.

Keywords: Theodosius Dobzhansky, Paul Tillich, Russian Orthodoxy, Ultimate concern, Teilhard de Chardin

Introduction

There are few biologists who can claim to have made a genuinely novel contribution to biology in the twentieth century. Theodosius Dobzhansky is one of those who can. His book *Genetics and the Origin of Species* 'marked the birth of the neo-Darwinian, synthetic, or biological theory of evolution,'[1] and many would consider it as 'the most important and influential book on evolution of the twentieth century.'[2] Through this and other works,[3] Dobzhansky can be credited with helping to pioneer the fledgling discipline of genetics. It was Dobzhansky's contribution in helping to 'break down the long-standing

1 Costas Krimbas 'The Evolutionary Worldview of Theodosius Dobzhansky', in Mark Adams (ed.) *The Evolution of Theodosius Dobzhansky*, Princeton NJ: Princeton University Press (1994), p.179

2 Jeffrey Powell quoted in Richard Lewontin 'Dobzhansky's *Genetics and the Origin of Species:* Is it still relevant?', *Genetics* (1997) 147, 351

3 See Francisco Ayala Theodosius Dobzhansky: 1900-1975, A Biographical Memoir, Washington DC: National Academy of Sciences (1985) for an exhaustive list of Dobzhansky's scientific and religious publications. To this can be added the various collections of correspondence and personal journals that have been made available.

dichotomy - indeed, antagonism - between field and laboratory work'[4] that means Dobzhansky 'has [a] good claim to having been the greatest evolutionist since Charles Darwin.'[5]

Dobzhansky's legacy is not just secured based on his contributions to genetics. He is just as likely to be cited for his theological views. Dobzhansky was certainly not alone in being a scientist who also harboured religious beliefs, but, more than any other biologist, his considerable scientific pedigree lends his theological writings a certain value in the religion and science discussion.

Much has been written on the work of Dobzhansky from numerous perspectives.[6] However, the role of Orthodox theology - with which Dobzhansky grew up and of which he remained a life-long adherent - and Paul Tillich - whose concept of 'ultimate concern' clearly influenced Dobzhansky's choice of a title for his only book-length theological treatise, *Biology of Ultimate Concern* - are largely unexplored in the secondary literature. This paper will therefore offer a novel exploration of his thought, which attempts to show how important Tillich is for understanding Dobzhansky's thought.

4 Garland Allen 'Theodosius Dobzhansky, The Morgan Lab, and the Breakdown of the Naturalist/Experimentalist Dichotomy, 1927-1947', in Mark Adams (ed.) *op cit*. p.97; see also Robert Kohler 'Fly Room West: Dobzhansky, D. *pseudoobscura*, and Scientific Practice', in Mark Adams (ed.) *op cit*. p.122; see also Leah Ceccarelli *Shaping Science with Rhetoric*, Chicago: The University of Chicago Press (2001); Richard Delisle 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', Studies in History and Philosophy of Biological and Biomedical Science (2011) 42, 51.

5 Michael Ruse 'Dobzhansky and the Problem of Progress', in Mark Adams (ed.) *op cit*. p.233

6 See Richard Delisle, 'Expanding the Framework of the Holism/Reductionism Debate in Neo-Darwinism: The Case of Theodosius Dobzhansky and Bernhard Rensch', *History and Philosophy of the Life Sciences* (2008) 30/2, 207-26; Richard Delisle, 'The uncertain foundation of neo-Darwinism: metaphysical and epistemological pluralism in the evolutionary synthesis', *Studies in History and Philosophy of Biological and Biomedical Sciences* (2009) 40, 119-32; Richard Delisle, 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', *Studies in History and Philosophy of Biological and Biomedical Science* (2011) 42, 50-9; David Depew, 'Adaptation as process: the future of Darwinism and the legacy of Theodosius Dobzhansky', *Studies in History and Philosophy of Biological and Biomedical Sciences* (2011) 42, 89-98; Michael Ruse, *Monad to Man*, Cambridge MA: Harvard University Press (1996), pp. 385-409; Konashev M.B., 'Pierre Teilhard de Chardin and Theodosius Dobzhansky: "Synthesis" of the Evolutionary Theory and Belief, and its Reception', in Barbara J.G., Dupont J.C., Kolchinsky E.I., Loskutova M.V. (eds.) *Russian-French Links in Biology and Medicine*, St. Petersburg: Nestor-Historia (2012) pp158-74; J.M. Van der Meer, 'Theodosius Dobzhansky: Nothing in Evolution Makes Sense Except in the Light of Religion', in Nicolas Rupke (ed.), *Eminent Lives in Twentieth-Century Science and Religion*, Frankfurt: Peter Lang (2007), pp. 79-101; Stephen Dilley 'Nothing in biology makes sense except in light of theology?', in *Studies in History and Philosophy of Biological and Biomedical Sciences* (2013) 44, 774-86

1. Dobzhansky the Geneticist

Although it was suggested before Dobzhansky that Mendelian genetics could provide the missing piece in Darwin's theory - that which provided the variation on which natural selection could work - Dobzhansky provided much proof of that fact. His most famous book *Genetics and the Origin of Species* leaves the reader in no doubt that 'gene mutations and structural and numerical chromosome changes are the principal sources of variation'[7] and which 'supply the genetic raw material from which evolutionary changes are constructed.'[8] Moreover, Dobzhansky demonstrated that the cause of these 'mutations' and 'structural changes' *were precisely* those that biologists were already familiar with as being caused by x-rays in the laboratory.[9]

Dobzhansky also demonstrated that 'there is no evidence of a direct adaptation in the process of mutation' so 'the organism is not endowed with a providential ability to respond to the requirements of the environment by producing hereditary changes consonant with these requirements.'[10] Thus, these mutations are 'random and undirected', meaning that '[m]utations arise regardless whether they are useful to the organism when and where they arise or ever,'[11] and so 'most genotypes have not absolute but only relative advantages.'[12] Dobzhansky provided further evidence of August Weismann's contribution that the inability of the phenotype (and so by extension a change in the environment of which the phenotype is a part)[13] to initiate specific (or indeed any) changes in the genotype.[14]

7 Theodosius Dobzhansky, *Genetics and the Origin of Species*, New York NY: Columbia University Press, (1982), p.118

8 Theodosius Dobzhansky, *Heredity and the Nature of Man*, London, George Allen & Unwin (1964), p.124

9 Dobzhansky, *Genetics and the Origin of Species*, pp. 82-3; See also Theodosius Dobzhansky, *Genetics and the Evolutionary Process*, New York NY: Columbia University Press (1970), p. 109; Theodosius Dobzhansky, *Mankind Evolving*, New Haven CT: Yale University Press (1962), p. 291; Richard Delisle, 'What was really Synthesised', *op cit*. 53; Patricia Williams, *Doing Without Adam and Eve*, Minneapolis MN: Fortress Press (2001), p.73; see also Ceccarelli *Shaping Science with Rhetoric*, *op cit*. pp.39-40

10 Dobzhansky, *Genetics and the Origin of Species*, p. 120; see also Theodosius Dobzhansky 'A Comment on the Discussion of Genetics by His Holiness, Pius XII' in *Science, New Series* (1953) 118/3071, 562

11 Dobzhansky, *Mankind Evolving*, p.47; see also Theodosius Dobzhansky, *Biology of Ultimate Concern*, London: Rapp and Whiting (1969), p. 41

12 Dobzhansky, *Biology of Ultimate Concern*, p. 60

13 By environment is meant not just the 'physical environment' - such as 'temperature, humidity, climate, soil' - but also the 'biotic environment' (by which Dobzhansky means 'associated organisms which serve as food or act as predators or parasites or competitors'), 'social or cultural environment' and also the 'genetic environment' (Dobzhansky, *Mankind Evolving*, p. 138).

14 Cf. Mae-wan Ho 'Nurturing Nature: How Parental Care Changes Genes', in Sheldon Krimsky & Jeremy Gruber (eds.) *Genetic Explanations*. Cambridge MA: Harvard University Press (2013)

Further, Dobzhansky was clear that these genetic mutations were 'deleterious'; more often than not they were destructive to the organism.[15] Yet, these same 'deleterious' mutations, in the right environment, could produce favourable advantages. Thus, 'classification of mutations into favourable and harmful ones is meaningless if the nature of the environment is not stated,'[16] so that the benefit or detriment of any mutation can only be determined in relation to the environment in which it emerges.[17] For example, the development of a thick coat is entirely random (that is, not a 'providential response' to the environment) and its benefit to the individual *ex*-environment is entirely neutral; it only becomes a positive or a negative when it appears on an arctic or a desert dweller respectively. On the former, it is *likely* to lead to greater survival and/or reproductive ability; on the latter, it is likely to lead to the opposite.

1.1. Natural Selection and Direction

'[M]utation alone, uncontrolled by natural selection, could only result in degeneration, decay and extinction.'[18] Yet, importantly, those mutations are not uncontrolled. Rather, '[n]atural selection, [Dobzhansky] said, is the innovative or "creative force" in evolution, not mutation.'[19] Natural selection means that mutation leads to novelty and life, not 'degeneration.'

There is some ambiguity in exactly how Dobzhansky understood natural selection to function. At times Dobzhanksy saw natural selection as an entirely 'neutral' or 'statistical' observation of differential survival and/or reproduction. In his book, *Mankind Evolving*, he writes that '[a]ny organism needs food and other resources in order to live; the resources are always limited; the number of individuals of any species is therefore also limited.' Therefore, a time will come when 'only a part of the progeny will be able to survive' and the 'statistical probability of survival or elimination, despite accidents, will depend on the degree of adaptedness of individuals and groups to the environment in which

p. 258

15 Dobzhansky, *Biology of Ultimate Concern*, p. 41; see also Dobzhansky, *Genetics of the Evolutionary Process*, p. 79

16 Dobzhansky, *Genetics and the Origin of Species*, p. 23

17 Likewise, the comparison of the 'adaptiveness' of mutations can only be made 'provided they exploit similar or overlapping adaptive niches, or compete for the same food or other resources.' (Theodosius Dobzhansky 'Chance and Creativity in Evolution', in Francisco Ayala & Theodosius Dobzhansky (eds.) *Studies in the Philosophy of Biology*, London: MacMillan Press (1974), p.322

18 Dobzhansky *Biology of Ultimate Concern,* p. 41

19 David Depew & Bruce Weber 'Developmental Biology, Natural Selection, and the Conceptual Boundaries of the Modern Evolutionary Synthesis', *Zygon: Journal of Religion and Science* (2017) 52/2, 470

they live' and this 'adaptedness is in part conditioned by genetic endowment.'[20] Thus, natural selection is not 'a benevolent spirit guiding evolution toward sure success', quite the opposite.

Yet, elsewhere, Dobzhanksy describes natural selection in ways that make it appear he saw it as, not only having a specific direction, but also having genuine creative agency. He writes that 'natural selection is in a very real sense creative...it brings into existence real novelties - genotypes that never existed before.'[21] He writes that 'chance is bridled in by an anti-chance agency, which is natural selection responding to environmental challenges,'[22] so that natural selection is a 'sophisticated regulating and guiding device.'[23] He writes that 'natural selection is the mechanism that translates the environmental challenges into genetic alterations.'[24] He also likens natural selection to 'a builder of a house from its raw materials,' so that '[n]atural selection is the process that builds evolutionary changes from the raw materials supplied by mutation.'[25]

Although Dobzhansky qualifies that one should not take this analogy 'too literally,' it is still difficult to see language of 'agency' and 'responding' as an analogy for the statistical probability of reproduction that is simply 'change in the frequencies of some genes.'[26] Even within the same essay, Dobzhanksy writes both that natural selection is 'differential reproduction' and that it 'performs the role of engineer - it devises both the ways to improve the models and the techniques of manufacturing them.'[27] However, there is a very big difference between acknowledging that survival/reproductive advantages are not random and Dobzhansky's rhetoric of 'builder' or 'engineer.' It is clear that natural selection is something more for Dobzhansky than the simple observation of statistical differential rates of survival or reproduction that at times he appeared to endorse. Natural selection does 'something' that would not occur without its presence.

20 Dobzhansky, *Mankind Evolving*, p.128

21 Dobzhansky ,*Biology of Ultimate Concern*, pp.60-1

22 *Ibid*., p.126

23 *Ibid*., p.126

24 Dobzhansky, *Mankind Evolving*, p.299

25 Dobzhansky, Heredity and the Nature of Man, pp. 125-6

26 Dobzhansky, *Genetics and the Evolutionary process*, p. 100; indeed, Dobzhansky 'may be considered the founder of experimental population genetics' (Francisco Ayala 'Nothing in biology makes sense except in the light of evolution: Theodosius Dobzhansky: 1900-1975', *The Journal of Heredity* (1977) 68, 5, yet here he seems to be arguing for something different.

27 Theodosius Dobzhansky, 'Mendel, Darwinism, and Evolutionism', *Proceedings of the American Philosophical Society* (1965) 109/4, 211-2

1.2. Evolution and Holism: Micro vs. Macro

This tension in understanding natural selection is comparable to the tension that Dobzhansky held between micro and macro evolution. If genetic mutation was the *sole* source of the raw material for natural selection, then '[t]here is no way toward an understanding of the mechanisms of macroevolutionary changes, which require time on a geological scale, other than a full comprehension of the micro-evolutionary processes.'[28] However, as Richard Delisle evidences, this did not prevent Dobzhansky from being 'first and foremost the adherent of a holistic way of thinking,'[29] which Delisle notes that Ernst Mayr called 'organicism' and who defined it as seeing organisation, rather than composition, as being the crucial aspect.[30] Thus, Dobzhansky held that 'the qualitative novelty of the human estate is the novelty of a pattern, not of its components.' In this way, humanity 'does not mean that a new force or energy has arrived from nowhere; it does mean that a new form of unity has come into existence.'[31] This allowed Dobzhansky to consider 'top-down' causality an important feature in evolution.

Importantly, then, when Dobzhansky writes that 'evolution as a whole has been progressive,'[32] the important word here is 'whole.' The 'whole' is constituted entirely and solely of random and deleterious genetic mutations, but when those mutations are understood in terms of the 'whole,' they take on another meaning. Thus, he might claim that 'the evolution of the symbolic supraorganism is, however, a problem separate from that of the evolution, or better the evolutions, of the millions of particular species of living being which inhabit our planet at present and inhabited it in the past,'[33] but the 'supraorganism' is composed entirely of those 'particular evolutions.' In other words, while microevolutionary 'mechanisms' are entirely sufficient to account for all macroevolutionary change, this does not mean that it is identical to macroevolution. Between micro and macro evolution - despite the latter being composed entirely of the former - there is a *qualitative* difference. While 'elementary evolutionary events' are 'reversible,' 'repeatable,' and 'deterministic,' this is '[n]ot so with macroevolutionary processes,' which are irreversible, 'unrepeatable,'

28 Dobzhansky *Genetics and the Origin of Species*, p.12; see also Richard Burian 'Dobzhansky on Evolutionary Dynamics: Some Questions about His Russian Background', in Mark Adams (ed.) *op cit*, p.130

29 Delisle 'Expanding the Framework of the Holism/Reductionism Debate in Neo-Darwinism: The Case of Theodosius Dobzhansky and Bernhard Rensch', *History and Philosophy of the Life Sciences* (2008) 30/2, 210

30 *Ibid*., 211

31 Dobzhansky, *Biology of Ultimate Concern*, p.58

32 *Ibid*., p.117

33 *Ibid*., p.119

and 'creative.'[34] Dobzhansky is able to maintain such a distinction between the two because the sheer number of accumulations of different mutations and selections that were required to reach any particular macroevolutionary event are 'infinitely unlikely' to be reversed or repeated in the same way or at all.[35] This, Dobzhansky acknowledges, is simply the result of Dollo's law, that as 'more and more genetic changes accumulate' so 'a reversal grows less and less probable, and soon becomes impossible.'[36] Thus, '[t]his is not because of any mysterious force which prevents their repetition, but simply because exact repetition has a probability close to zero.'[37]

It is because of such a distinction that Dobzhansky is able to argue that '[t]he differences between man and animals are, then, merely quantitative,'[38] but those '[q]uantitative differences may grow large enough to become qualitative.'[39] Dobzhansky called these 'large differences' 'transcendences': 'critical event[s] in evolutionary history' which facilitate the 'attainment of a new level of dimension.'[40] These transcendences, Dobzhansky continues, 'represent breaks in the evolutionary continuity' and 'show that evolution as a whole, has been progressive.'[41] This was not a 'saltation' (no matter how different any transcendence was, it could be exhaustively explained by the accumulation of micro-evolutionary variations), but seen in the context of the whole, it was genuinely novel. In books such as *Mankind Evolving and Heredity and the Nature of Man*, Dobzhansky clearly sees humanity as representing a genuine progress from other, non-human, creatures. It is not that there are 'two kinds of evolution,' it is only that the 'boundary' between quantitative and qualitative 'can only be arbitrary.'[42] It is not that a novel 'component' has emerged, but a novel 'pattern' or 'constellation.'[43]

This sheer number of steps between micro and macro allow Dobzhansky to maintain two contradictory elements side by side: (what could be called) the 'individual instances' of selection, and the 'overall effect' that it had. On an individual level, natural selection is 'trial and error' yet, on a global level, there is a direction in selection. It also meant that Dobzhansky was able to hold on to a sense of progress in evolution, while maintaining that genetic mutation itself

34 Dobzhansky, *Heredity and the Nature of Man*, p.209

35 *Ibid*., p.209

36 Dobzhansky, *Genetics and the Evolutionary Process*, 428-9

37 Theodosius Dobzhansky, 'Teilhard de Chardin and the Orientation of Evolution', *Zygon: Journal of Religion and Science* (1968) 3/3, 252-3; see also Dobzhansky ,*Mankind Evolving*, p.47

38 Dobzhansky, *Biology of Ultimate Concern*, p.130

39 *Ibid*., p.131

40 *Ibid*., p.44

41 *Ibid*., pp.116-7

42 Dobzhansky, *Genetics and the Evolutionary Process*, p.429

43 Dobzhansky, *Biology of Ultimate Concern*, p.58

was entirely accidental.

1.3. Natural Selection and Groping

It is here that Dobzhansky points to the idea of groping. Groping might be likened to someone trying to navigate a forest without a map or compass to guide. The more directions in which one can send 'navigators' - even though they have no means of finding their goal and simply wander in arbitrary, random directions - the more likely it is that one of them will find the goal. Comparatively, the more different forms natural selection can form, the more likely it is that one of them will lead to greater progress, even though mutation and selection are blind. In this way, natural selection can be described as 'working in an opportunistic manner.'[44]

Groping is a 'succession of trials and errors, some of them resulting in inventions,'[45] it is the creation of 'numerous trial parties "exploring" the possibilities of different environments'[46] and can be seen as *how* natural selection can 'direct' the 'chance' of genetic mutation,[47] and how evolution 'tries everything.'[48] Indeed, Dobzhansky claims that '"[g]roping in the dark is the only way that natural selection can proceed.' In some organisms evolution has been 'regressive' and in others it has 'seemingly given to production of endless variations on the same theme,'[49] yet, when it is taken as a whole, those retrogressions and circular variations are part of a wider, progressive, groping.

The idea of groping is borrowed from Teilhard de Chardin.[50] However, Teilhard uses the idea differently to how Dobzhansky understood it. In *Phenomenon of Man*, Teilhard described 'groping' as 'directed chance,'[51] yet Teilhard meant this as a sort of 'synthesis' between Darwinism and Lamarckism, not in the sense that Dobzhansky used it. At the lower levels of evolution chance, not consciousness, was dominant. Nevertheless, because of his adherence to panpsychism, Teilhard still maintained there was a degree of consciousness relative to the complexification of the organism. This consciousness meant that there was *some* direction, but chance was by far the dominant force, thus

44 Ernest Boesiger 'Evolutionary Theories after Lamarck and Darwin', in Francisco Ayala & Theodosius Dobzhansky (eds.) *Studies in the Philosophy of Biology*, London: MacMillan Press (1974), p. 39

45 Dobzhansky, *Biology of Ultimate Concern*, p.121

46 *Ibid*., p. 125; see also Delisle 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', *op cit*. 55

47 Dobzhansky, *Biology of Ultimate Concern*, p.128

48 Dobzhansky, *Heredity and the Nature of Man*, p.215

49 *Ibid*.p.119

50 *Ibid*., p.128

51 Pierre Teilhard de Chardin, Phenomenon of Man, New York NY: Harper & Row (1959) p.110

evolution could be seen to 'grope' - a sort of feeling in the dark, a 'blind direction,' a conscious direction but too dim to be dominant.[52] With humanity, consciousness and direction has become the dominant force, relegating the role of chance, and so the role of 'groping' with it. Thus, Robert O'Connell writes that 'human inventiveness points to some measure of groping "ingenuity" at work in the prehuman phase of evolution.'[53] For Dobzhansky, groping is constantly operating to 'direct' the 'chance' mutations towards an overarching progress; for Teilhard, groping is what non-human creatures whose life is characterised (although not entirely) by chance do before the directing consciousness of humanity takes over, rendering chance - and with it groping - obsolete.

It is in this direction that Dobzhansky is keen to apologise for Teilhard's use of the idea of 'orthogenesis.' Orthogenesis, Dobzhansky claims, is 'evolution following a path which is predestined'[54] so 'would create nothing new, and extinction would be a mystery'[55] and is likened to ontogeny rather than to phylogeny.[56] So, Dobzhansky continues, 'in spite of himself, Teilhard was not an exponent of orthogenesis,'[57] instead, Teilhard 'used the word "orthogenesis" not in the technical biological, but in a philosophical and mystical, sense.'[58] Dobzhansky avers that Teilhard's misuse may be due to the fact that he only had a 'hazy idea' about the modern synthesis. Yet, based on groping, this is how Teilhard understood evolution. Certainly, for Teilhard, there was genuine jeopardy in evolution, there was a real and genuine risk of failure, but there was also a definite predestined end: the 'Omega Point.'

Rather, Dobzhansky may have more in common with Teilhard's muse, the Nobel Laureate philosopher Henri Bergson, for whom Dobzhansky also appeared to have a 'youthful enthusiasm.'[59] While it is certain that Dobzhansky did not subscribe to vitalism in any sense, Delisle notes some comparisons between the way that Bergson saw the *elan vital* as a goalless 'push' towards

52 See Pierre Teilhard de Chardin, *Science and Christ*, London: Collins (1965) p. 207

53 Robert O'Connell *Teilhard's Vision of the Past*, New York NY: Fordham University Press (1982) p.88

54 Dobzhansky, *Biology of Ultimate Concern*, p.120

55 *Ibid*., p.61; Ernan McMullin also criticises orthogenesis as being 'sharply anti-evolutionary, since it excludes the possibility that fundamentally new properties can emerge from matter that entirely lacks them' (Ernan McMullin 'Natural science and belief in a Creator: historical notes', in Robert Russell, William Stoeger, and George Coyne *Physics, Philosophy, and Theology: A Common Quest for Understanding*, Vatican City: Vatican Observatory (1988) p. 69). Hence, Teilhard precisely because he was an orthogenecist, was forced to affirm panpsychism; if consciousness is not a fundamental part of matter then (for the orthogenecist) there is no way to explain human consciousness.

56 Dobzhansky, *Biology of Ultimate Concern*, p.118

57 *Ibid*., p.120

58 Dobzhansky, *Heredity and the Nature of Man*, p.151

59 Ruse, *Monad to Man*, p.395

genuine creation of new creatures and Dobzhansky's idea of groping.[60] Thus, Dobzhansky writes that '[n]atural selection "directs" this "chance" into adaptive channels,' but there is no 'set purpose' which evolution 'accomplishes.'[61] For Dobzhansky, 'man is in the world through God's will and his meaning is to be God's servant,'[62] but this does not mean that evolution has ended with humanity, or will possibly end in the future.[63]

1.4. Criticisms

Dobzhansky's approach is not without criticism. It is far from clear whether Dobzhansky is convincing in his claim that one can hold together qualitative difference that is constructed entirely of quantitative differences, and whether this legitimises his scheme of seeing evolution as both deleterious and determinative on the one hand and creative and progressive on the other. Certainly, the appeal to 'patterns' over 'components' helps his cause. One can make accurate predictions about the behaviour of groups based on statistical or stochastic probability of observed patterns, but this does not mean that one can predict the behaviour of an individual within that group. It is unclear whether Dobzhansky can legitimately maintain that randomness can be seen as exhibiting direction if only it is seen from the correct perspective. As a result, Richard Delisle claims Dobzhansky is 'forced to take some liberties with the concept of natural selection in order to make it fit his general understanding of evolution,'[64] that he 'present[s] the concept of natural selection in a rather peculiar way, somewhat distorting its meaning,'[65] and that he 'shoehorns' 'neo-Darwinian mechanisms...into a wider epistemological/metaphysical framework.'[66] Elsewhere, Delisle admits confusion that such a dyed-in-the-wool Darwinian, who is almost unanimously regarded as *the* single most important evolutionary thinker in the twentieth century and the 'poster boy' for the neo-Darwinian

60 Delisle, 'Expanding the Framework of the Holism/Reductionism Debate in Neo-Darwinism: The Case of Theodosius Dobzhansky and Bernhard Rensch', 217; see also Delisle 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', 55

61 Dobzhansky *Biology of Ultimate Concern*, p.128

62 *Ibid*., p.90

63 Although, at times, Dobzhansky at times speaks as if he does assume a specific, identifiable end to which evolution is heading (see John Greene & Michael Ruse 'On the Nature of the Evolutionary Process: The Correspondence between Theodosius Dobzhansky and John C. Greene', in *Biology and Philosophy* (1996), 11, 462; Dobzhansky, *Biology of Ultimate Concern*, p.112; Van der Meer *Op. Cit*., 6-7, 9).

64 Delisle, 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', 54

65 Delisle, 'Expanding the Framework of the Holism/Reductionism Debate in Neo-Darwinism: The Case of Theodosius Dobzhansky and Bernhard Rensch', 215

66 Delisle, 'The uncertain foundation of neo-Darwinism: metaphysical and epistemological pluralism in the evolutionary synthesis', 123

synthesis, should be fascinated with 'groping' and 'creative evolution.'[67]

John C. Greene also criticises Dobzhansky for 'trying to have their cake and eat it on the subject of teleology in evolution' and that he should 'abandon the vocabulary or revise [his] postulates,' which are 'totally at war.'[68] Indeed, Greene later berates some of Dobzhansky's comments which 'smacks of vitalism, Lamarckism, and other things which are supposed to be hideous to modern biologists.'[69] Despite calling him the greatest biologist of the twentieth century, Michael Ruse is likewise critical of Dobzhansky. He writes that 'Dobzhansky read his progression into nature, rather than from it, and [so] his science was shaped in such a way as to support such a reading,'[70] so that while he may have been 'professional' 'there was, to be honest, a sleight of hand.'[71] It is this tension between micro- and macro-evolution that presents some of the biggest problems for Dobzhansky's work. It is just not clear that Dobzhansky can hold them together at one point (as identical mechanisms) and hold them apart at another (as both random and directional).

Of course, Dobzhansky died before further significant progress in genetics and evolutionary biology occurred. Speculation on how he may have incorporated this progress into his thought lies outside the scope of this essay, but it is important to note that he may well have addressed some of these criticisms had he been around to learn of ongoing progress in genetics. Nevertheless, while Dobzhansky may have his critics, he is by no means an aberration. David Depew is supportive of Dobzhansky's 'dynamical Darwinism.'[72] Antje Jackelén also acknowledges that the reductionist account of biological evolution is being challenged and that '[t]oday biologists emphasize the significance of systems, focus to a greater extent than previously on wholes as compared to parts...and describe properties of systems as emerging results of the whole which is more than the sum of parts.'[73] The appeal to holism and 'top-down causality' has already been noted in relation to Dobzhansky's evolutionary theory. What is perhaps more pertinent is that these comments were made by an Archbishop, underlining that the themes that are so central to Dobzhansky's evolutionary

67 Delisle, 'Expanding the Framework of the Holism/Reductionism Debate in Neo-Darwinism: The Case of Theodosius Dobzhansky and Bernhard Rensch', 217; see also Delisle, 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', 55

68 Greene & Ruse, *op. cit.*, p. 451; see also p.459-61; see also V.B. Smocovitis, 'Humanizing Evolution: Anthropology, the Evolutionary Synthesis, and the Prehistory of Biological Anthropology, 1927–1962', *Current Anthropology* (2012) 53/ 5, 113

69 *Ibid*., 467

70 Ruse, *Monad to Man*, p.401; See Delisle 'What was really synthesized during the evolutionary synthesis? A historiographic proposal', 55

71 Ruse, *Monad to Man*, 407

72 Depew, *op.cCit*., p.90

73 Antje Jackelén ‚A critical view of "theistic evolution"', *Theology and Science* (2007) 5/2, 159

theory - which are precisely those seen as superfluous and distorting by critics - are those which are shared by so many twentieth century theologians. It is to Dobzhansky's theology that this paper now turns.

2. Dobzhansky the Theologian

In the previous section, Dobzhansky's evolutionary theory was characterised as a tension between a purely statistical/stochastic observation of change and a genuinely creative and directed process. As has been recognised, this tension can be seen as irreconcilable, and many biologists and commentators have criticised Dobzhansky for failing to deal with it. However, it is not necessary that such a tension does cause a problem. There are many other biologists who follow Dobzhansky's approach; testament to the unparalleled place he occupies in twentieth century biology (as outlined in the introduction to this paper). In other words, either there is no problem in holding such a tension, or many biologists hold this tension, and so this is not a problem with Dobzhansky's particular exposition of evolution.[74] Perhaps, then, there is no problem with Dobzhansky's evolutionary theory, for which a particular religious outlook is required to enable such a tension to be reconciled. That is not the aim of the paper. Rather, the aim is to show, not that there is a problem with Dobzhansky that requires a solution, but that it is in this tension between statistical/stochastic observation of change and genuinely creative and directed process that Dobzhansky's religious perspective is most clear. To put that differently, while a religious perspective might not be needed to hold together this biological tension (because there may not be a problem with such a biological tension), it can be shown how Dobzhansky's religious perspective allows an easier accommodation of such a tension. Dobzhansky's religious perspective can help to ground the tension that lies at the heart of his evolutionary theory.

Dobzhansky never presented a fully-formed theological system, but he was described by those who knew him best as 'the most religious man I have ever met.'[75] Precisely what religious beliefs Dobzhansky subscribed to is difficult to ascertain.[76] On the one hand, Dobzhansky came from a family of Russian Orthodox priests,[77] was formed in the Orthodox tradition, and continued to be an active member of the Russian Orthodox Church up to his death. Yet, on the other hand, Dobzhansky explicitly identified the Roman Catholic Jesuit Pierre Teilhard de Chardin as being an important influence and gave his most famous theological work - *Biology of Ultimate Concern* - a title that so clearly betrays

74 I thank an anonymous reviewer for this observation.

75 Greene & Ruse, *Op. Cit.*, p. 446

76 Dilley, op.cit., 775

77 Mikhail Konashev, 'From the Archives: Dobzhansky in Kiev and Leningrad', in Mark Adams (ed.) op.cit., pp. 63-4

the influence of Lutheran Paul Tillich.

2.1. Dobzhansky and Russian Orthodoxy

While there are accounts of Dobzhansky's religion that indicate he did not subscribe to the tenets of the faith (personal God, survival of death etc),[78] religion was clearly important to him.[79] However, significantly, there is no engagement with contemporary issues within Orthodox theology (at least in Dobzhansky's published material). This may seem even more odd when it is acknowledged that both Georges Florovsky and John Meyendorf (arguably two of the most important and influential Russian Orthodox theologians of the twentieth century) were both at the height of their respective careers and present in New York at the same time as Dobzhansky. It seems unlikely that Orthodox materials were unavailable to him; even if they were only in the native Russian, this would hardly be a problem for Dobzhansky.[80]

There may be important reasons for this. Christopher Knight suggests that for Orthodoxy, modern science is little more than footnotes to the study of Patristics.[81] Efthymios Nicolaidis *et al* note that, Orthodoxy 'scarcely participated' in the European scientific revolution, and so there was a concern over 'the "legitimacy" of knowledge that did not originate from its own spiritual tradition,'[82] so, for example, '[t]he Russian Church saw Jesuit [i.e. western] science as a Trojan horse being used to penetrate the kingdom.'[83] Acceptance of modern science required, first and foremost, the acceptance of an alien philosophy and culture.[84] There were also moral concerns. Nicolaidis *et al* argue that in 1920s and 30s Greece, Darwinism was 'deemed a natural ally of the communist cause' and so attacks on Darwinism amounted to attacks on communism.'[85] John Hed-

78 Francisco Ayala, 'Nothing in biology makes sense except in the light of evolution: Theodosius Dobzhansky: 1900-1975', *The Journal of Heredity* (1977) 68, 9; John Haldane, 'Scientism and its Challenges to Humanism', in *New Blackfriars* (2012) 93/1048, 675; although this conflicts with other stories of his engaging in prayer (Krimbas *op. cit*., p.188).

79 Krimbas *op. cit*., p.188

80 Of course, Dobzhansky does use other Russian sources. He often quoted Dostoyevsky (who Teresa Obolevitch claims is 'commonly perceived as "Russia's greatest metaphysician"' (Teresa Obolevitch, *Faith and Science in Russian Religious Thought*, Oxford: Oxford University Press (2019) p. 59) and was influenced by Russian philosopher Valdimir Solovyev (see Van der Meer, *op. cit*.).

81 Christopher Knight 'Science and the Eastern Orthodox Church: Historical and Current Perspectives', *Science and Christian Belief* (2013) 25/1, 49

82 Nicolaidis E., Delli E., Livanos N., Tampakis K.,& Vlahakis G., 'Science and Orthodox Christianity: An Overview' in Isis (2016) 107/3, 545

83 Nicolaidis, *Science and Eastern Orthodoxy*, 149

84 c.f. Obolevitch *op. cit*., 32-3

85 Nicolaidis *et* al 'Science and Orthodox Christianity: An Overview', 564

ley Brooke and Ronald Numbers allude to a similar situation in Soviet Russia, where 'the sciences became vehicles of atheism and materialism, suspicion compounded indifference.'[86] The preoccupation with the early church Fathers and the role of Hesychasm in Orthodox theology gives it little opportunity to be a meaningful conversation partner about what theology looks like in an evolutionary paradigm.[87]

However, Sophiologists Vladimir Florensky and Sergei Bulgakov both engaged with evolution from an Orthodox perspective. Yet, while both were supportive of the compatibility of evolution with Orthodox theology, both were critical of Darwinism.[88] Bulgakov, reminiscent of modern approaches, writes that evolution 'determines only the "how," not the "what" of creation,'[89] so it is possible to 'consider the various stages of this evolution not as caprices of chance but as the manifestation of an inner plan, the actualisation of the prototypes of the world.'[90] However, it is unclear whether Dobzhansky would have had access to their work. While Florensky published some material before the Russian Revolution, his confrontational standing with the Soviet authorities made it extremely difficult for him to publish. Bulgakov, who had already been exiled to Paris before he published his most influential work, would have been much easier to get hold of but it is still unclear whether Dobzhansky read them.

In this case, Dobzhansky's regular church attendance could be seen more as a cultural affinity with and loyalty to the Church of his homeland, more than a thought-out theological position.[91] It is perhaps in this context that Dobzhansky's response that taking communion on a trip to Mount Athos 'reminded him of his childhood' makes best sense (although Krimbas suggests that this may have been a remark to suit his audience, rather than representing his true

86 John Hedley Brooke & Ronald L. Numbers, 'Science, Eastern Orthodoxy, and World Religions', in *Isis* (2016) 107/3, 593

87 Of course, there were also those who, much like their western counterparts, simply dismissed any form of evolutionary thought on the basis of a literal interpretation of Genesis, despite it being widely recognised that Orthodox theology is more open to allegorical readings of Genesis than is western theology (see Seraphim Rose *Genesis, Creation and Early Man: The Orthodox Christian Vision*, Platina CA: St Herman of Alaska Brotherhood (2000); Alexander V. Khramov, 'Fitting Evolution into Christian Belief: An Eastern Orthodox Approach', *International Journal of Orthodox Theology* (2017) 8/1; Paul Ladouceur, 'Evolution and Genesis 2–3: The Decline and Fall of Adam and Eve', St Vladimir's Theological Quarterly, (2013) 57/1.

88 See Pavel Florensky, *At The Crossroads of Science & Mysticism*, Kettering OH.: Semantron Press (2014), pp. 30ff.

89 Sergei Bulgakov, *The Bride of the Lamb*, Grand Rapids MI: William B. Eerdmans (2002), p. 73

90 Marcin Skladanowski 'The Devil in Technologies: Russian Orthodox Neoconservativism versus Scientific and Technological Progress', in Zygon: Journal of Religion and Science, 54/1 (2019), 51-2

91 See Skladanowski *Op. Cit.*, 51-2

feelings).[92] Alternatively, it may simply be that Dobzhansky's desire to be part of the public debate (and so ensure wide readership of his book) meant that he had no desire to seek out Orthodox sources.

The role of Teilhard may also be instrumental here. It is telling that Dobzhansky published nothing on religion until after he had read Teilhard. In correspondence with John C. Greene, Dobzhansky laments the lack of a synthesis of religion and science,[93] then, after reading *Phenomenon of Man*, indicates that he intended to write his own.[94] It was Teilhard that prompted Dobzhansky to start publishing his thoughts. The absence of Orthodox sources may not be due to Dobzhansky paying only lip-service to Orthodoxy, but to the fact that he was encouraged to publish by, and so was engaging with, what he saw in Teilhard.

However, while Teilhard was clearly influential for Dobzhansky, Dobzhansky did not take on much of Teilhard's thought. As Charles Taylor comments, Dobzhansky 'was surely not persuaded by any rational argument in Teilhard's writing. Rather he was enchanted by the vision of a progression.'[95] Instead, Taylor claims that Teilhard 'simply provided a moderately respectable authority which Doby [sic] could reference.'[96] Dobzhansky was not endorsing Teilhard's particular theory (or any *particular* theological response to evolution); Teilhard was nothing more than evidence that such a project was not only possible, but could be successful.[97] Dobzhansky was not trying to present the reader with a fully developed theological system, but an apology for such an attempt.

What is of particular interest here is that Teilhard himself was appreciative of the eastern Orthodox theological approach. Teilhard criticises the 'Latin Fathers...for having overdeveloped the rabbinical and legalistic side of St. Paul in their theology'[98] and embraces a Christology in which the role of Christ is seen within a much wider paradigm of creation, and the Christ event (no longer evoked solely by the need for salvation) is that which moves creation towards a genuinely novel future. For the east, the Christ event is not a legal trial; it is the creation of something new.

What is crucial here is that Teilhard, despite being a member of the Catholic Church, was very 'eastern' in his theology. This is not to suggest that Dobzhansky was drawn to Teilhard *because* of this 'easterly' direction, but it certainly adds to the role of Orthodox theology in Dobzhansky's own endeavours.

92 Krimbas, *Op. Cit.*, 188

93 Greene & Ruse, *op. cit.*, 449

94 *Ibid*., 457

95 Charles Taylor 'Dobzhansky, Artificial Life, and the "Larger Questions" of Evolution', in Mark Adams (ed.), op.cit. pp166-7

96 *Ibid*., 167

97 See Krimbas, *op. cit.*, 189

98 Pierre Teilhard de Chardin, *Christianity and Evolution*, London: Harvest (1971), p. 89

2.2. Dobzhansky and Paul Tillich

The title of Dobzhansky's book length treatise on science and religion clearly betrays a Tillichian influence. It is unmistakable that *Biology of Ultimate Concern* points towards Tillich's claim that religion was humanity's 'ultimate concern.' Although Dobzhansky devotes an entire chapter to Teilhard in that book, no one is referenced more (at least in terms of index entries) than Tillich. Yet, while Teilhard's influence on Dobzhansky is well explored in the secondary literature, almost no attention is paid to the influence of Tillich.

The clearly central role that Dobzhansky gave to Tillich's notion of 'ultimate concern' could help to further elucidate how Dobzhansky understood the relationship between science and religion. For Tillich, 'ultimate concern' is simply a 'translation of the great commandment: "The Lord, our God, the Lord is one; and you shall love the Lord your God with all your heart, and with all your soul and with all your mind, and with all your strength."[99] Anything and everything else - from art, to music, to literature, and biology - is simply a 'preliminary concern.' Theology, Tillich continues, 'should never leave the situation of ultimate concern and try to play a role within the arena of preliminary concerns.'[100]

Yet, this does not set theology and science apart from one another. Certainly, Tillich writes that 'scientific truth and the truth of faith do not belong to the same dimension of meaning' so that '[s]cience has no right and no power to interfere with faith and faith has no power to interfere with science,'[101] but this should not be taken as evidence that Tillich's theology of the relationship between science and religion is characterised by what Stephen Jay Gould would later call 'non-overlapping magisteria' (NOMA),[102] as Richard Grigg recognises.

The clue to how Tillich understands the relationship can be found in the introduction to *Systematic Theology*,[103] in which Tillich criticises seeing the relationship between 'ultimate concern' and 'preliminary concerns' as either a 'mutual indifference' (which 'places our ultimate concern beside other concerns and deprives it of its ultimacy') or by elevating a 'preliminary concern' to that of 'ultimate concern' (which is 'idolatrous in its very nature'). The first can be seen as a criticism of NOMA - in which science and religion are seen as entirely separate but equally valid in their explanations of the world from different perspectives using different language - whereas the second could be seen as comparable to what Teilhard was doing - in which science is elevated

99 Paul Tillich, *Systematic Theology Vol.1*, Chicago: University of Chicago Press (1951), p. 11

100 *Ibid*., p. 12

101 Paul Tillich, quoted in Richard Grigg, 'Religion, Science, and Evolution: Paul Tillich's Fourth Way', *Zygon: Journal of Religion and Science* (2003), 38/4, 945; see also Tillich, *Systematic Theology Vol.1*, 130

102 Stephen Jay Gould, *Rocks of Ages*, London: Jonathan Cape (2001), p. 51

103 Tillich, *op. cit*., p. 13

to being a genuine source of theological revelation.[104] Rather, 'preliminary concerns' (e.g. biology and genetics) should be seen as 'bearers and vehicles' of the 'ultimate concern' (theological truth). *Biology of Ultimate Concern*, then, does not attempt 'to derive a philosophy from biology,'[105] but to see biology as a 'bearer and vehicle' of theology.

What does it mean for biology to be a 'bearer and vehicle' of theology? An answer can be found in another important Tillichian category: the 'method of correlation.' Correlation is the theological method that Tillich utilises in *Systematic Theology*, and he describes it as explaining 'the contents of the Christian faith through existential questions and theological answers in mutual interdependence.'[106] The immediate philosophical context in which Tillich undertakes this task is existentialism, not because existentialism is simply the philosophical language of the day, but because the question of existence - and its 'estrangement' from nature - is the most basic of all questions.[107] For Tillich, it is precisely because existence is estranged from essence (which is the language of Tillich's doctrine of original sin and reconciliation) that philosophy alone (i.e. philosophy without the 'ultimate concern' of theology) cannot provide an answer to the question of existence and so any answer must be religious;[108] the answer to the question of existence can only be an 'ultimate concern.'

Robert John Russell situates Tillich's 'method of correlation' within the tension between kerygma and situation. Russell writes that '[a] theology shaped by [correlation] seeks to combine the statement of the truth of the Christian message with the interpretation of that truth for each generation.' This is achieved by balancing 'the demands of kerygmatic theology, which emphasizes the unchangeable truth of the message that is being addressed to the temporal situation,' with 'apologetic theology, which emphasizes that the answers given to the temporal situation are answers to questions implied in that situation.'[109] When this method is applied to the question of scientific knowledge specifically, it is easy to see that the issue is not how theological 'narrative' and scientific 'narrative' can be reconciled - so that science and theology together present a coherent picture of the world (as with many examples of 'theistic evolution,' and which would simply see Genesis and evolution as a concordism) - but how 'the symbols used in the Christian message' can make sense of the 'problem'

104 Although, interestingly, Tillich was complementary of Teilhard's work (Paul Tillich, *Systematic Theology Vol. 3*, London: SCM Press (1978), p. 5.

105 Dobzhansky, *Biology of Ultimate Concern*, p. 2

106 Tillich, Systematic Theology Vol.1,p. 60

107 Guyton Hammond 'An Examination of Tillich's Method of Correlation', *Journal of Bible and Religion* (1964), 32/3, 248

108 *Ibid*., 249

109 Robert J. Russell, 'The Relevance of Tillich for the Theology and Science Dialogue', *Zygon: Journal of Religion and Science* (2001), 36/2, 271

of existence that science describes. Put simply, science becomes a new context and new language in which and through which the theologian can expound the 'ultimate concern' of the reconciliation of existence and essence. The exercise is not to find a way for science and theology to fit nicely together into one coherent explanation of the world, but for the unchanging 'kerygma' of theology to be presented afresh, symbolically, to a new situation, which in turn helps to understand the human condition. The question then becomes not 'how does science prove the Genesis narrative to be correct?' but 'how is the kerygma relevant to an evolutionary world?'

Richard Grigg makes a similar observation in his essay 'Religion, Science, and Evolution: Paul Tillich's Fourth Way,' in which he argues that Tillich presents a 'fourth way' of understanding the relationship between science and religion, as opposed to the 'three ways' of opposition, separatism and engagement.[110] Grigg argues that, following Tillich, 'engagement' should not be seen as a 'concordism,' but should elucidate a link between 'scientific reason' and 'ecstatic reason' - i.e. 'reason grasped by an ultimate concern.'[111] In this way, evolution becomes an existential question of estrangement that requires a religious answer of reconciliation. Evolution does not present the theologian with a problem of divine activity (e.g. how it is that God ensures the realisation of certain goals or desires); evolution presents the theologian with a new situation - a new 'vehicle' - in which and through which the theological truths of Christianity must be made relevant.

Grigg continues that this 'fourth way' means that 'evolution and God come into substantive contact via our own, human quest for redemption.'[112] In this way, the evolutionary process becomes the 'threat of non-being' in the face of which the 'quest for being' takes on meaning. In the language of Tillich, evolution is the 'existence' (i.e. the situation in which creatures find themselves and which constitutes their 'fallenness') that is estranged from 'essence', and so becomes the context in which redemption is sought and found; theology is that which infuses meaning in the apparent meaninglessness of a truly Darwinian evolution.

Dobzhansky uses this idea (albeit slightly nuanced) in *Biology of Ultimate Concern*. In the preface to the book, Dobzhansky confesses that he is not trying 'to derive a philosophy from biology, but rather to include biology in a *weltanschauung*.'[113] Seen through a Tillichian lens, to 'derive a philosophy from biology' would be to elevate a 'preliminary concern' to the level of 'ultimate concern', which Tillich has criticised. However, to 'include biology in a wel-

110 See John Haught, *God After Darwin: A Theology of Evolution*, Boulder CO: Westview (2000)

111 Grigg, 'Religion, Science, and Evolution: Paul Tillich's Fourth Way', 948

112 *Ibid*., 948

113 Dobzhansky, *Biology of Ultimate Concern*, p. 2

tanschauung' is to see the biology as a vehicle that illuminates the 'ultimate concern'.

Elsewhere in *Biology of Ultimate Concern*, Dobzhansky again draws on Tillich to support his understanding of the relationship between religion and science. Quoting Tillich, while 'theology cannot rest on scientific theory,' 'it must relate its understanding of man [sic] to an understanding of the universal nature' so that failure to answer this would 'become a stumbling block for a man's [sic] whole religious life.'[114] This means that the particular or subjective history of humanity - of a particular human - must be embedded in the wider, universal history of the universe, not so that the subjective history becomes a part of the wider history (so that each subjective history is only an incomplete part of something bigger and more important), but so that the subjective history becomes a mirror of that wider history. Or, the wider history becomes an interpretative category for this particular subject; the wider history becomes a 'vehicle of meaning' that illuminates the meaning of the subjective history. What is meaningless for the individual suddenly becomes illuminated with meaning when it is seen through the interpretive lens of the whole.

Again in *Biology of Ultimate Concern*, Dobzhansky quotes Tillich that religious symbols (i.e. the kerygma, that for which science and evolution is a vehicle and bearer) 'open up a level of reality, which is otherwise not opened' so that '[r]eligious symbols open up the experience of the dimension of this depth in the human soul.'[115] For Dobzhansky, then, following Tillich, the theological task is not to 'filter out' the elements of science that do not correspond to the theological message, but to present the theological message in a new context. For Dobzhansky to call his book *Biology of Ultimate Concern*, then, is not to argue that biology *itself* is the ultimate concern - so that the theologian is able to find theological truth *in* biology - but to argue that biology can become a medium through which the religious symbols can be illuminated.

This whole Tillichian paradigm of kerygma, symbols and 'ultimate concern', has a clear connection with Dobzhansky's idea of groping (which further clarifies the difference with which Dobzhansky and Teilhard understood the concept). Groping, for Dobzhansky, is not the faint glimmer of a specific end that is only groped through the 'chaos' of chance (as for Teilhard), but is the searching for the genuinely new. It is only when the 'random' and 'accidental' is seen in the light of the whole, that what was 'random' and 'accidental' to the individual is infused with purpose and a direction can be seen. This is almost identical to the way that the kerygma is related to the situation. In the language of Tillich, it is only when the situation of the subjective history is allowed to be interpreted through the kerygma of ultimate concern that the situation becomes a vehicle

114 Paul Tillich, quoted in Dobzhansky, Biology of Ultimate Concern, pp. 109-10
115 *Ibid*., 96

of the ultimate concern. The 'existence' of the individual is meaningless until it is reconciled with its 'essence' (i.e. seen within the wider context of the whole).

3. Dobzhansky as Conjunctive Explainer

While Dobzhansky (in a Tillichian context) saw evolution as a new language in which to expound the eternal kerygma of Christian truth, that does not mean that he did not think that evolution was not genuinely divinely guided. 'Correlation' was not a way of superimposing an alien interpretation over biological evolution in order to retain a theological sense in a world that is increasingly rejecting it. 'Correlation' did not make the claim for progress in evolution simply a facile rhetoric that called randomness by a new name without adding anything significant: everything was random but we can *call* it progress. There was genuine progress in evolution; for Dobzhansky, 'evolution (cosmic + biological + human) is God's method of creation.'[116] Dobzhansky can see genuine *progress* in evolution, but only through the lens of evolution as a 'vehicle' and illuminator of the 'symbol' of the quest for reconciliation between existence and essence. Dobzhansky would have been drawn to seeing a genuine progress in history and evolution because of his Orthodox sensibilities. Tillich, then, becomes a way of holding the progress that Dobzhansky saw in evolution and the meaningless of genetic mutation that he saw in the lab. As with groping, the meaninglessness of mutation, the 'regressive' nature of some organism's evolution and the 'endless variations on the same theme' of others,[117] become meaningful when seen within the wider whole, the kerygma or 'ultimate concern', which becomes a 'vehicle' or 'symbol' of that 'ultimate concern'. It is through the lens of Tillich then that Dobzhansky can be seen as an adherent of what might be called 'conjunctive explanations,' that the conjunction of science and religion *together* provide a greater explanatory power than either explanans individually.

Of course, Dobzhansky was discerning enough to recognise that progress could not be a *scientific* claim. In a letter to John C. Greene, Dobzhansky confesses that he does not doubt that evolution 'like everything in the world, is a manifestation of God's activity', but '*as a scientist*, [he] does not observe anything that would prove this.'[118] For the scientist to discover God's activity as a scientist, would only serve to degrade the ultimate concern into a preliminary one. Dobzhansky, then, does not force onto biology an alien interpretation; it is a new vehicle of the kerygma of God's salvation history, but it is a genuine vehicle of God's salvation history. While concordism is rightly rejected (see above), there is a sense in which biology becomes a way of retelling salvation history.

116 Greene & Ruse, *op. cit.*, 452; see also Krimbas *Op. Cit.*, p. 188

117 Dobzhansky, *Biology of Ultimate Concern*, p. 119

118 Greene & Ruse, *op. cit.*, p. 464 (*italics* in original)

Evolution as *how* God creates or as a manifestation of divine activity (which is essentially the same thing), inevitably leads to questions of how Dobzhansky understood divine activity. He was certainly no Thomist (at least not explicitly). Dobzhansky's interest in Teilhard, Tillich and eastern Orthodox only serves to strengthen that observation. He was also too discerning to think of God as a 'cause among causes', as another *univocal* actor in time and space manipulating the outcome of evolution in largely the same way (although more unlimited) that other creatures might manipulate it. He was also clearly critical of the 'meaningless philosophy' of Whitehead, in which God acts as a 'lure' to guide evolution.[119] Rather, Dobzhansky confesses to John C. Greene that:

> I see no escape from thinking that God acts not in fits of miraculous interventions, bit in all significant and insignificant, spectacular and humdrum events. [Panentheism], you may say? I do not think so, but if so then there is this much truth in [panentheism].[120]

This is significant. For Dobzhansky to explicitly characterise himself in this way gives an important insight that helps to contextualise his other claims (in the same letter) that he saw evolution as a manifestation of divine activity.

Panentheism has enjoyed serious interest in late twentieth and early twenty-first century theology, with theologians seeing it favourably as a way of retaining a sense of God that works within the natural laws of the world. More pertinently, Niels Henrik Gregersen judges that 'panenthesitic views of God may therefore relate more easily to aspects of the exploration and co-opting of ecospace so central to current developments within evolutionary theory.'[121] Panentheism complements understandings of evolution that favour 'groping.'

There are a number of different ways of understanding panentheism, and an exposition of those many ways is outside the scope of this essay,[122] however, a brief few comments will be offered here to show how this understanding of a panentheistic God, who works *through* evolution, can be congruent with the idea of groping that was so central for Dobzhansky.

In Paths From *Science to God* (among others) Arthur Peacocke offers an interesting interpretation of panentheism in which he argues that God acts on the world as a spatio-temporal whole, whose activity or influence then

119 *Ibid*., p. 462

120 *Ibid*., p.463; in the original article, Greene & Ruse transcribe this as 'pantheism', which Ruse has admitted in personal correspondence was an error and that Dobzhansky actually wrote 'panentheism'.

121 Niels Henrik Gregersen, 'The Exploration of Ecospace: Extending or Supplementing the Neo-Darwinian Paradigm', *Zygon: Journal of Religion and Science* (2017), 52/2, 583

122 See Philip Clayton & Arthur Peacocke (eds.) *In Whom We Live and Move and Have Our Being: Panentheistic Reflections on God's Presence in a Scientific World*, Grand Rapids MI.: William B. Eerdmans Publishing Company (2004)

'trickles down' through the spatio-temporal structures of the universe to affect everything.[123] This 'whole/part' influence is clearly another way of arguing for 'top-down causality' and holism, which Richard Delilse argued was so crucial for Dobzhansky. Importantly, Peacocke explicitly points to Dobzhansky's and Teilhard's idea of 'groping' to support his own claim that God uses these sorts of 'top-down causes' to 'explore' the evolutionary landscape. In this way, '[c]hance is the search radar of God, sweeping through all the possible targets available to its probing.'[124]

However, ultimately, Peacocke goes further than Dobzhansky (presumably) would be comfortable. He writes that the presence of 'top-down' causation in evolution means that 'selective evolutionary processes may properly be regarded as the cause of changes that are established in the DNA of living organisms.'[125] That is clearly a Lamarckian view, in which the environment provokes and constrains genetic mutation. It also seems not to allow *genuine* groping because the 'paths' that are 'tried' or 'searched' are limited to those selected by 'top-down' causes. For Dobzhansky, groping was progress from randomness, not a constraint on randomness to ensure a specific progress.

Even though some argue that 'Dobzhansky comes to a position that is very similar to Peacocke's,'[126] it is another panentheist, Maurice Wiles, who may have more in common with Dobzhansky. Similarly, for Wiles (following Gordon Kaufmann),[127] there is one 'master-act' that represents God's action in the world. This one act is comprised of a number of constituent 'sub-acts,' which are held together by a unity of intention.[128] The example that Wiles (and Kaufmann) use to illustrate this idea is that of several 'sub-acts' of hammering a nail that are united by the 'master-act' or intention of putting a nail into a piece of wood.[129]

The salient feature of Wiles' idea is that while it is properly the agent of the master-act who can be said to perform the act and (importantly) so that which can be said to give meaning to the sub-acts, uniting them or pulling them together into a coherent whole, it is not necessarily the agent of the master-

123 Arthur Peacocke *Paths from Science Towards God*, Oxford: OneWorld (2001), pp. 109-10

124 Arthur Peacocke, quoted in James Nelson, 'Does Science Clarify God's Relation to The World', *Zygon: Journal of Religion and Science* (1991), 26/4, 521

125 Arthur Peacocke, *Theology For A Scientific Age*, London: SCM Press (1993), p. 158

126 Jacob Klapwijk, 'Creation Belief and Paradigm of Emergent Evolution', in *Philosophia Reformata* (2011) 76/1, 15

127 See Gordon Kaufman, 'On the Meaning of "Act of God"', in Owen Thomas (ed.) *God's Activity in the World: The Contemporary Problem*, Chico CA: Scholars Press (1983)

128 Maurice Wiles, *God's Action in the World,* London: SCM Press (1986), 54

129 *Ibid*., 96

act who actually performs the sub-acts.[130] For Wiles, therefore, there is more genuine freedom. Whereas for Peacocke it was God who influenced (and so constrained) the 'sub-acts' (although he does not use the language of master-act and sub-act that Wiles and Kaufmann use), for Wiles (and Kaufmann) it is the master-agent (God) who brings together disparate sub-acts into one. The master-actor acts, and can rightly be said to be the agent of the act, but this in no way constrains or impinges upon the freedom of those who are rightly the agents of the sub-acts. This appears to correlate more with Dobzhansky's position than does Peacocke's.

3.1. Freedom and Synergia

If 'correlation' allowed the theologian to see genuine progress in random evolution without having to resort to admitting that this was a neat rhetorical flourish without any substance, then, conversely, admitting that there was genuine progress in evolution, which was guided by God, did not likewise evacuate the claim that evolution was also genuinely random. If evolution was genuinely guided, then it was also genuinely random. Certainly, as a panentheist (or sympathetic to panentheism) Dobzhansky saw God as infusing meaning in the evolutionary process, but there is also a genuine randomness; God, as an explanation, is incomplete.

The reason that Dobzhansky rejected orthogenesis was because he simply could not accept that God was responsible for evil. If orthogenesis is simply the unfolding of a previously determined plan, then this made God responsible for the evil that occurred. In *Biology of Ultimate Concern*, Dobzhansky recognises that any theory of evolution - such as orthogenesis or finalism (Lamarckism) - that understands evolution to be 'predetermined or guided collides head-on with the ineluctable fact of the existence of evil.'[131] For Dobzhansky (as for so many), it is the presence of evil that shows evolution cannot be (wholly) divinely guided. As much as evolution is how God creates, 'this does not oblige [Dobzhansky] to say that God manipulates the segregation of genes or the nerve impulses in human brains.'[132]

It is here that a key Eastern Orthodox category becomes central. For Augustine and the west, the emphasis on original justice or the original perfection of the first couple demands a 'great fall,' including a 'bondage of the will'. Contrarily, the Orthodox had no problem with human will, and so had a much more positive assessment of *post-lapsarian* humanity. For Orthodoxy, human

130 *Ibid*., 93

131 Dobzhansky, Biology of Ultimate Concern, p. 120

132 Greene & Ruse, *op. cit*., 452

freedom was not lost in the fall.[133] The fall was not the loss of anything, but the 'perversion' of those 'instincts which in themselves are necessary for the continuance of animal life upon earth.'[134] Philip Hefner, drawing on this approach typifies sin as being 'rooted firmly in human freedom, and the amelioration of the human condition lies in the redirecting of the free will,'[135] so that 'sin emerges in the course of our inadequate and wrongful use of the possibilities inherent in our nature.'[136] Sin is the misuse of freedom, not the *absence* (or bondage) of freedom.

The favourable *post-lapsarian* view allowed eastern theologians to develop a theory of *synergia*: humanity - while in no way equal to God - worked with God to bring about the fulfillment of creation.[137] For Orthodox theologians, synergia, is not about creatures playing an *active* role in bringing about their own salvation. Rather, it was about the submission of the will to God's providence and not frustrating God's plans. Anna Williams, for example, writes that 'synergia [is] not so much the cooperation of God and humanity considered as equals but as the process whereby human persons offer their wills to God's sanctifying action.'[138] Just as in Christ the human will/energy is in perfect submission to the divine, so creatures must submit their own will to the divine. In this way, '[it is] not whether sanctification is God's work or ours but whether our sanctification can be accomplished against our will or without or wills.'[139]

When this doctrine of *synergia* is seen in an evolutionary context, Dobzhansky's idea of groping is clearly comparable. Just as without the saving-hand of God, human freedom is meaningless, so without the ordering-hand of God evolution will be meaningless - a pointless and arbitrary meander, which accounts for nothing more than 'variations on a theme.' However, when the ordering-hand of a Wiles-ian panenthesim is taken in conjunction with the genuine freedom of *synergia*, there is greater explanatory power. Yes, science gave no evidence that there was a guiding, ordering-hand of God, but this does not mean that such a guiding, ordering-hand does not add real explanatory power to the genetics. Likewise, yes there is a guiding hand, but this does not eliminate the randomness of mutation and so does not eliminate the genuine

133 Georges Florovsky, Creation & Redemption, Belmont MA: Norland Publishing Company (1976), p. 102

134 N.P Williams, *The Ideas of The Fall and of Original Sin*, London: Longmans, Green & Co. (1927), p. 272

135 Philip Hefner 'Biological Perspectives on Fall and Original Sin', *Zygon: Journal of Religion and Science* (1993), 28/1, 83

136 *Ibid*., 84

137 Knight ,*op. cit*., 40

138 Anna Williams *The Ground of Union: Deification in Aquinas and Palamas*, Oxford: Oxford University Press (1999), p. 133

139 *Ibid*., p. 130

novelty and adventure of evolution. That tension between ordering-hand and *synergia* is brought into sharper focus in the tension between kerygma and situation. Evolution provides a new context in which this same tension in which the kerygma gives the situation a newfound meaning is the model with which Dobzhansky understands God can imbue the meaningless of random mutation with a guiding direction.

4. Conclusion

It is necessary to temper what this paper has said with a caution: ultimately, it may be that we are reading too much into Dobzhansky. He was not a professional theologian. It may be that he simply did not see the tensions between Teilhard and Tillich and so the suggestion that his theological endeavours were an attempt to strike a middle path between Teilhard, Tillich and Orthodoxy were not intended.

Excellence in one discipline does not equate to competence in another. It may be necessary ultimately to criticise Dobzhansky for presenting a confused theology. Such a criticism should not be taken as an attempt to re-evaluate his place among the great biologists of the twentieth century. Dobzhansky never claimed to be a *theologian*, and his unrivalled contribution to *biology and genetics* should not be affected by any criticism of the former. On the contrary, excellence in one discipline might help you see things in another discipline in a fresh light. What is presented here is a suggestion that Dobzhansky can be seen as a new way of reading through these issues.

For Dobzhansky, neither discipline could provide the full picture regarding evolution. This is not to say that either discipline was somehow incomplete, that the only way to finish the scientific puzzle of evolution is with theological pieces. Dobzhansky was clearly with Tillich in rejecting the idea that the two could be seen as working on the same 'level.' Thus, it is not so much that both God *and* the organism act together in the same event to produce the same outcome (much like Austin Farrer), but yet one cannot detect the presence of the other. Evolution is not constrained by God and has genuine freedom. Rather, God is that which pulls all of these together, who becomes that which gives the meaninglessness meaning. Seen on its own, science might be able to exhaustively explain evolution, but it sees no meaning in it. Yet, seen through the lens of theology, that very same meaninglessness, without the addition of anything new, becomes a vehicle of divine kerygma; it becomes the situation in which the organism reconciles its existence with its essence; it becomes divinely guided. Groping and Tillich, therefore, allow God to genuinely direct and freedom to genuinely exist; they allow microevolution to be genuinely random and accidental and macroevolution to be genuinely directed and creative; they allow the quantitative differences to be qualitative, without the addition of anything new.

Acknowledgements: This research was funded by the John Templeton Foundation. I would like to thank Diarmid Finnegan and David Livingstone for their helpful comments in preparing this paper. I would also like to thank Michael Ruse, whose assistance with research (particularly regarding Dobzhansky's beliefs) was invaluable.

David Brown is a Research Fellow at Queen's University Belfast