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Mere Summing Up? Some Considerations on the History of the Concept of Emergence and its Significance for Science and Religion

The concept of 'emergence' is of increasing interest to Christian theologians working in the science and religion field. This paper offers a long view of the concept of emergence and its significance for religion and theology. To do so, it reconstructs the accounts of three pioneers of the philosophy of emergence – John Stuart Mill, Samuel Alexander and C. D. Broad. It further relates their positions to contemporary debates concerning the theological appropriation of emergence, in particular in the writings of Nancey Murphy and Philip Clayton.

Key words: Emergence; nonreductive physicalism; John Stuart Mill; Samuel Alexander; C. D. Broad; Nancey Murphy; Philip Clayton

Introduction

The concept of 'emergence' now occupies a central position in the philosophy of science[1] This enthusiasm for emergence is now spreading into those areas of

1 For discussions of emergence in various scientific contexts, see Gregersen, Niels Henrik (ed.) *From Complexity to Life. On the Emergence of Life and Meaning*, New York: Oxford University Press (2003); Morowitz, Harold *The Emergence of Everything: How the World Became Complex*, New York: Oxford University Press (2002); Barabási, Albert-Laszlo *Linked: The New Science of Networks*, Cambridge, MA: Perseus (2002); Johnson, Steven *Emergence: The Connected Lives of Ants, Brains, Cities, and Software,* New York: Touchstone (2001); Freeman, Anthony 'The Emergence of Consciousness', *Journal of Consciousness Studies* (2001) 8(9-10); Holland, John *Emergence:From Order to Chaos,* Cambridge, MA: Perseus (1998); Deacon, Terrence *The Symbolic Species*, New York: W. W. Norton (1997); Green, Simon *Principles of Biopsychology*, Hove: Lawrence, Erlbaum Associates (1994) and Lewin, Roger *Complexity: Life at the Edge of Chaos*, Chicago: University of Chicago Press (1992). For the philosophical discussion, see Van Gulick, Robert 'Reduction, Emergence and Other Recent Options on the Mind/Body Problem: A Philosophic Overview', *Journal of Consciousness Studies* (2001) 8, 1-34; Crane, Tim *The Elements of Mind*, Oxford: Oxford University Press (2001); Bedau, Mark 'Weak Emergence', *Philosophical Perspectives. Mind, Causation, and World* (1997) 11, 375-399; Silberstein, Michael and McGeever, John 'The Search for Ontological Emergence', *The Philosophical Quarterly* (1999) 49,182-200; Silberstein, Michael 'Emergence and the Mind-Body Problem', *Journal of Consciousness Studies* (1998) 5(4), 464-482; Humphreys, Paul 'How Properties Emerge', *Philosophy of Science* (1997) 64,1-17; 'Emergence, Not Supervenience', *Philosophy of Science* (1997) 64,337-345; 'Aspects of Emergence', *Philosophical Topics* (1996) 24(1), 53-70; O'Connor, Timothy 'Emergent Properties', *American Philosophical Quarterly* (1994) 31,91-104; Kaufmann, S. *At Home in the Universe: The Search for the Laws of Self-Organization and Complexity*, New York: Oxford University Press (1993); Bekermann, Angsar, Flohr, Hans, & Kim, Jaegwon, (eds.) *Emergence or Reduction? Essays on the Prospects of Nonreductive Physicalism*, Berlin: Walter de Gruyter (1992).

the science and religion field influenced by the philosophy of science, above all those engaged in articulating the consequences for theology of nonreductive physicalism.[2] Emergence, however, is not new; neither is its application to theology.

It is generally accepted that there have been four phases in the development of the concept of emergence.[3] After some initial unsystematic reflections on the concept in the mid-nineteenth century by John Stuart Mill and George Lewes, emergence was developed into a full-blown theory in the 1920s with the rise of 'emergent evolution' and the movement of 'British Emergentism' (the former associated above all with Conwy Lloyd Morgan, the latter with the philosophers Samuel Alexander and C. D. Broad).[4] After this peak of interest in emergence, however, the concept seems to have gone into decline, to be picked up again in the 1970s by psychologists and philosophers of mind.[5] This article

2 See Murphy, Nancey 'Supervenience and the Downward Efficacy of the Mental: A Nonreductive Physicalist Account of Human Action', In Russell, Robert John, Murphy, Nancey, Meyering, Theo C. & Arbib, Michael A. (eds.) *Neuroscience and the Person. Scientific Perspectives on Divine Action*, Vatican City: Vatican Observatory Publications (1999), pp. 147-164; 'Nonreductive Physicalism: Philosophical Issues', In Brown, Warren S., Murphy, Nancey, & Malony, H. Newton (eds.) *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, Minneapolis: Fortress Press, (1998), pp. 127-148 and Clayton, Philip *Mind and Emergence. From Quantum to Consciousness*, Oxford: Oxford University Press (2004); 'Emergence', In van Huyssteen, Wentzel (ed.) *Encyclopedia of Science and Religion*, 2 vols., New York: Macmillan (2003), vol. I, pp. 156-158 and 'Neuroscience, the Person, and God. An Emergentist Account', In Russell, Murphy, Meyering and Arbib, *op. cit.*, pp. 181-214. Both are also editors of forthcoming books dealing with the concept of emergence and its importance for science and religion. See also, Taylor, Mark C. *The Moment of Complexity. Emerging Network Culture*, Chicago: University of Chicago Press (2001); Freeman, Anthony 'God as an Emergent Property', *Journal of Consciousness Studies* (2001) 8(9-10), 147-159; Brown, Warren S., 'Conclusion: Reconciling Scientific and Biblical Portraits of Human Nature', In Brown, Murphy, and Malony, *op. cit.*, (2), pp. 213-228; Peacocke, Arthur 'The Sound of Sheer Silence: How does God communicate with Humanity?', In Russell, Murphy, Meyering and Arbib, *op. cit.*, (2), pp. 215-248 and *God and the New Biology*, London: Dent (1986). For an alternative interpretation, concentrating on an 'emergent dualist' defence of the soul, see Hasker, William *The Emergent Self*, Ithaca: Cornell University Press (1999).

3 See McLaughlin, Brian 'The Rise and Fall of British Emergentism', In Beckermann, Flohr and Kim, *op. cit*., (1), pp. 49-93; Stephan, Achim 'Emergence – A Systematic View on its Historical Aspects', In Beckermann, Flohr and Kim, *op. cit*., (1) pp. 25-47); Crane *op. cit*.,(1), and Clayton *op. cit*.,(2), Ch. 1.

4 Mill, John Stuart *System of Logic*, London: Longmans, Green, Reader & Dyer (1843); Lewes, George H. *Problems of Life and Mind*, 2 vols., London: Kegan Paul, Trench, Turbner, & Co. (1875); Morgan, Conwy Lloyd *Instinct and Experience*, London: Methuen (1912); *Emergent Evolution*, London: Williams and Norgate (1923); Alexander, Samuel *Space, Time, and Deity*, 2 vols., London: Macmillan (1920); Broad, C. D. *The Mind and Its Place in Nature,* London: Routledge and Kegan Paul (1925). See also Blitz, David *Emergent Evolution. Qualitative Novelty and the Levels of Reality*, Dordrecht: Kluwer Academic Publishers (1992).

5 See especially, Bunge, Mario, 'Emergence and the Mind', *Neuroscience* (1977) 2, 501-509; Popper, Karl, and Eccles, John *The Self and its Brain*, New York: Springer International (1977); MacKay, Donald *Human Science and Human Dignity*, London: Hodder and Stoughton (1979); MacKay, Valerie (ed.) *Behind the Eye*, Oxford: Blackwell (1991); Sperry, Roger 'Mind-brain interaction: Mentalism, yes; Dualism, no', *Neuroscience* (1980) 5,195-206; 'In Defense of Mentalism and Emergent Interaction', *Journal of Mind and Behavior* (1991) 12(2), 221-245 and Smart, J. J. C. 'Physicalism and Emergence', *Neuroscience* (1981) 6,109-113. The wider canon of thinkers with emergentist or quasi-emergentist accounts includes, amongst others, Alfred North Whitehead, Bernard Lonergan,

aims to revisit the earlier phases in the development of the concept of emergence, in particular the accounts given by Mill, Alexander and Broad, in order to shed some light on the significance of, and prospects for, the application of emergence to contemporary science and religion. In addition, by reconstructing three major 'early emergentist accounts' I hope to broaden the horizons of contemporary debates and bring into clear view some of the rich material from the earliest phases of the theoretical development of emergence.

1. Types of emergence: epistemological and ontological accounts

Before turning to the historical accounts, it is necessary to make a typological distinction between emergence as an epistemological theory about our descriptions of the world and emergence as an ontological theory about the way reality is structured.[6] Epistemological accounts of emergence recognise that the behaviour of complex systems or composite wholes cannot adequately be explained in terms of laws or processes appropriate to the constituent elements and instead invoke 'higher-level' descriptions. The properties referred to by such descriptions are considered as 'epistemologically emergent'. As Silberstein and McGeever clarify:

> A property of an object or system is epistemologically emergent if the property is reducible to or determined by the intrinsic properties of the ultimate constituents of the object or system, while at the same time it is very difficult for us to explain, predict or derive the property on the basis of the ultimate constituents.[7]

Michael Polyani, and the ever-enigmatic Teilhard de Chardin. See Barbour, Ian G. 'Neuroscience, Artificial Intelligence, and Human Nature: Theological and Philosophical Reflections', In Russell, Murphy, Meyering and Arbib, *op. cit.*, (2), pp. 249-280 for a brief account of the compatibility between process thought and emergence. Equally important is the 'pre-history' of emergentist thought, above all in the idealist-neoplatonic tradition, exemplified by Plotinus and Hegel. See Clayton *op. cit.*, (2), pp. 7-9 for a brief account. It is to be hoped that the contemporary resurgence of interest in emergence might occasion a fully comprehensive intellectual history of the concept beyond the limited accounts currently available.

6 See Silberstein and McGeever *op. cit.*, (1), and O'Connor and Wong (http://plato.stanford.edu/entries/properties-emergent/). The distinction between epistemological and ontological accounts of emergence, reformulated as that between 'weak' and 'strong' emergence, is also central to Clayton *op. cit.*, (2)'s interpretation of the prospects of emergence for theology.

7 Silberstein and McGeever *op. cit.*, (1), p.186. It is perhaps important here to distinguish between the related concepts of emergence and supervenience. Supervenience is not emergence. Supervenience is descriptive of one phenomenon or property being dependent upon another without being reducible to it, not of the way in which that dependent non-reducibility is understood. Hence, a reductive physicalist version of supervenience is as possible as an emergentist one – indeed, many argue that it is the only coherent account of the relation of supervenience. For more on supervenience, see Kim, Jaegwon, *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation*, Cambridge, MA: MIT Press (1998); 'Supervenience as a Philosophical Concept' (1990) in *Supervenience and Mind: Selected Philosophical Essays*, Cambridge: Cambridge University Press (1993), pp. 131-160 and Hogan, Terence, 'From Supervenience to Superdupervenience: meeting the demands of a material world', *Mind* (1993) 102: 555-586.

According to such epistemological accounts, the complexity of the structures and patterns of causal interactions exhibited by higher-levels of reality makes it possible 'that at each stage entirely new laws, concepts and generalizations will be necessary (though not in principle) to explain or predict the phenomena with relative ease'.[8] Emergence is, in other words a heuristic category used to give a more adequate explanation or description than that which can be given in terms of the lower-order alone. In short, 'epistemologically emergent properties are novel only at the level of description'.[9]

By contrast, ontological emergence is understood as the claim that there is a relationship – emergence – between higher-level entities (or complex systems) and their constituent lower-level entities (or simple units), such that it is not possible (in principle) to deduce the properties of the former from the properties and relations of the latter. Emergence is thus understood to be characteristic of entities and systems; not of explanations or descriptions. Silberstein and McGeever claim:

> Ontologically emergent features are neither reducible to nor determined by more basic features. Ontologically emergent features are features of systems or wholes that possess causal capacities not reducible to any of the intrinsic causal capacities of the parts nor to any of the (reducible) relations between the parts.[10]

O'Connor and Wong further specify:

> Ontological emergentists see the physical world as entirely constituted by physical structures, simple or composite. But composites are not (always) mere aggregates of the simples. There are layered strata, or levels, of objects, based on increasing complexity. Each new layer is a consequence of the appearance of an interacting range of 'novel qualities'. Their novelty is…a novel, fundamental type of property altogether. We might say that it is 'nonstructural', in that the occurrence of the property is not in any sense constituted by the occurrence of more fundamental properties and relations of the object's parts. Further, newness of property, in this sense, entails new primitive causal powers, reflected in laws which connect complex physical structures to the emergent features.[11]

To reiterate: ontological emergence is the claim that emergence is a fact about the world and that emergent properties are understood as 'features of systems or wholes that possess causal capacities not reducible to any of the intrinsic causal capacities of the parts nor to any of the (reducible) relations

8 *ibid.*, p. 186.
9 *ibid.*, p. 186. See further, their claim that for epistemological accounts, 'emergence is merely an artefact of a particular model or formalism generated by macroscopic analysis, functional description or some other kind of "higher-level" description or explanation'. *ibid.*, p. 182.
10 *ibid.*, p. 186.
11 O'Connor and Wong *op. cit.*, (6).

between the parts'.[12] One important corollary of this is that understanding composite wholes and complex systems solely in terms of their physical (material) make-up is not the same as understanding them in terms of the physical (material) make-up of their constituent parts. In other words, for ontological emergence, the world is more than simply a set of lower-level entities or simple units continually arranged and rearranged into composite wholes and complex systems without alteration. Rather the world is itself composed of wholes and complex systems, which can then be dissected into various component parts without, however, the assumption that nothing will be lost in the process.[13]

i. epistemological emergence

a. J. S. Mill: homopathic versus heteropathic causation

The first acknowledged modern formulation of emergence as a developed understanding of relation between higher and lower level properties can be found in John Stuart Mill's 1843 text, *A System of Logic*. Far from the narrowly focused exercise one might expect from such a title, Mill's 'system' is more appropriately described as a classification of scientific knowledge, written, in part, to defend inductive reasoning and committed throughout to the truth of scientific empiricism. Mill nonetheless denies the universal applicability of a crude reductive materialism:

> All organized bodies are composed of parts, similar to those composing inorganic nature, and which have even themselves existed in an inorganic state; but the phenomena of life, which result from the juxtaposition of those parts in a certain manner, bear no analogy to any of the effects which would be produced by the action of the component substances considered as mere physical agents. To whatever degree we might imagine our knowledge of the properties of the several ingredients of a living body to be extended and perfected, it is certain that no mere summing up of the separate actions of those elements will ever amount to the action of the living body itself.[14]

As an empiricist, Mill will not sanction a non-physical causal influence responsible for the constellation of such complex wholes being greater than the 'mere summing up' of their constituent parts; nor is he persuaded that a reductive 'mechanical' explanation can be found. Instead, he invokes the principle of

12 Silberstein and McGeever *op. cit.*, (1), p. 182.
13 This claim effectively amounts to a denial of 'atomistic reductionism', namely the claim that it is only the basic 'atoms' constitutive of reality that are 'really real'. It is, as Silberstein and MeGeever put it, a 'failure of part-whole reduction, as well as the failure of mere logical supervenience'. *ibid.*, p. 182. See also Davies, Paul and Gribbin, John *The Matter Myth: Dramatic Discoveries that Challenge our Understanding of Physical Reality*, New York: Simon and Schuster (1992) for further analysis of the failure of atomist reductionism.
14 Mill *op. cit.*, (4), Bk III, ch 6, §1.

emergence, according to which such complexities can be explained scientifically – albeit according to the terms of an expanded empirical science. Differentiating between 'mechanical' and 'chemical' causation, Mill affirms that chemical causation (seen paradigmatically for him in chemical reactions) is not subject to the reductive 'law of the composition of causes'. Mechanical and chemical are for Mill divergent 'modes', in which the conjunction of cause and effect can be understood. It is important to emphasise that for Mill both mechanical and chemical causation are genuinely causal – the key point about chemical or emergent relations is simply that they cannot be reduced to the mechanical. In essence here Mill is proposing two alternative types of physical causation and he outlines two types of causal effects and laws characteristic of these different relations: 'homopathic' and 'heteropathic'.

Mill's understanding of chemical reactions as exemplars of the nonmechanical mode of causation has, of course, been shared by very few of those involved in the development of the sciences of chemistry since his day, such that there is very little scientifically plausible about his theory, no matter how attractive it might be philosophically. Mill's account clearly demonstrates the weaknesses of attempting to identify the emergent relationship with one particular type of causation. Mill considered chemical relations to be emergent because they could not be fully explained reductively in terms of additive mechanical logic. Once that obstacle was overcome (and overcoming such lacunae is fundamental to the ambition of reductive explanations), the plausibility of Mill's theory is fatally undermined. The same fate can be expected to await those contemporary accounts of emergence that identify one particular as yet unexplained mode of causation (be it the neurological processes that give rise to consciousness, or quantum mechanics) as emergent. If emergence is to be not simply another name for the mysterious or the inexplicable, but rather, as Mill intends, a genuinely causal relationship that cannot be understood in physical terms, then accounts of it must resist the temptation to rely upon the current lacunae in reductive physicalist explanations. Gaps in scientific explanation have a habit of being filled, such that the hopes invested in those gaps cannot be sustained. In addition, such an approach is open to the charge of being unscientific and of resting content with a philosophical obscurantism that can only lead to scientific stagnation and, ironically perhaps, to a reduction in scientific understanding.

b. Samuel Alexander and the quality of life

The emphasis upon emergence as a distinctive quality exhibited by certain entities or systems is further developed by one of the key figures of the so-called British Emergentism, the philosopher Samuel Alexander, whose Gifford Lectures, published in1920 as *Space, Time, and Deity* was a characteristically ambitious attempt to outline a 'theory of everything'. In contrast to Mill, however, Alexander was more influenced by the Idealist frame of philosophy then dominant in British philosophical circles than the empiricism that characterised Mill's generation. Unlike many of his contemporaries, however, Alexan-

der did not consider the growing (one might say, adolescent) natural sciences as inimical to the philosophical (and theological) enterprise; rather he sought to integrate contemporary science within a philosophical framework derived from a rich combination of home-grown British empiricism with an anglicised continental idealism, heavily indebted to Spinoza. In contrast to the crude reductionism of the increasingly confident and assertive natural sciences, Alexander considered himself a defender of the traditional affirmation that there is more to life than the physical realities that can be observed and studied by science, without invoking a vitalist non-physical substance or entelechy (which was as unacceptable philosophically as it was scientifically). Alexander's 'emergentism', is a product of the search for a third way between the extremes of vitalism and empiricism, in order to explain the processes of life scientifically without reducing them to the epiphenomenal residue of the material. To use contemporary terminology, Alexander's account is physicalist in as much as he rejects vital substances; it is nonreductive in as much as he retains the legitimacy of irreducible vital qualities.

For Alexander, life is neither a transcendent substance nor an unexceptional and unremarkable component of physical reality; rather it is 'a new quality'.[15] This novel quality, however, is not thought of as being introduced to or instantiated in certain entities under certain conditions, as the scholastic doctrine of 'ensoulment' would understand; instead the 'distinctive quality' that is life 'emerges' from the physical under certain conditions of organisation.[16] Alexander is adamant that a living human being is at base characterised by a single process, the base elements of which are exclusively physical (or as he prefers 'physico-chemical'), and yet equally firm that such a commitment to materialism does not exclude the possibility of the affirmation of an irreducible quality of life over and above the physical. In language which is not always as precise as could be desired (perhaps a consequence of the profound influence of Spinoza upon his thought), Alexander claims:

> We are forced, therefore, to go beyond the mere correlation of the mental with these neural processes and to identify them. There is but one process which, being of a specific complexity, has the quality of consciousness…[17]

However, as he continues in the following pages, consciousness is a novel quality that is 'not merely neural' but that has the character of 'something new, a fresh creation'.[18] When the conditions are correct, when the organisation is sufficiently complex, the physical gives rise to novel qualities that exceed the 'mere physico-chemical' qualities without in any way implying that these qualities are based upon (owe their existence to) anything other than the mere physico-chemical reality. As he writes in a famous passage:

15 Alexander *op. cit.*, (4), Vol. II, p. 62.
16 *ibid.*, II, p. 55.
17 *ibid.*, II, p. 5.
18 *ibid.*, II, pp. 6, 7.

> Physical and chemical processes of a certain complexity have the quality of life. The new quality life emerges with this constellation of such processes, and therefore life is at once a physico-chemical complex and is not merely physical and chemical, for these terms do not sufficiently characterize the new complex which in the course and order of time has been generated out of them. Such is the account to be given of the meaning of quality as such. The higher quality emerges from the lower level of existence and has its roots therein, but it emerges therefrom, and it does not belong to that level, but constitutes its possessor a new order of existent with its special laws of behaviour. The existence of emergent qualities thus described is something to be noted, as some would say, under the compulsion of brute empirical fact, or, as I should prefer to say in less harsh terms, to be accepted with the 'natural piety' of the investigator. It admits of no explanation.[19]

It is important to note a significant contrast between Alexander and Mill. Whilst Mill was adamant that emergent properties could be explained, and developed his theory of heteropathic effects and laws as a means of so doing, Alexander is more content to leave the explanation of the emergent quality of life unstated. In a manner reminiscent of the Kantian separation of the realm of scientific facts from that of moral and religious values, Alexander's strident claim that the existence of emergent qualities is to be accepted on faith seems to undermine the scientific validity of his account. Mill may have been guilty of ascribing emergent properties to a little understood branch of science, but at least he offered a scientific explanation for them. Equally, Alexander has a somewhat ambiguous attitude to the 'special sciences'. He does not deny their autonomy, but he restricts their explanatory power. For example, psychology – the special science of the emergent quality of consciousness – is not to be given any hermeneutic validity beyond that of a description of the characteristics of consciousness. Psychology is essential, as the quality of life is more than the mere physics and chemistry from which it emerges; it is however severely limited in its explanatory capacity and cannot explain the central mystery of the emergence of consciousness itself. In other words, psychology is restricted to mere description – the real work of explanation still lies with the science(s) of the physico-chemical reality.[20]

> To call [a structure] an organism is but to mark the fact that its behaviour, its response to stimulation, is, owing to the constellation, of a character different from those with which physics and chemistry are ordinarily concerned with, and in this sense something new with an appropriate quality, that of life. At the same time, this new method of behaviour is also physico-chemical and may be exhibited without remainder in physico-chemical terms, provided only the nature of the constellation is known…Until that

19 *ibid.*, II, pp. 46-47.
20 Interestingly, Alexander remains undecided whether chemistry is reducible to physics, or whether, as with Mill, it should be considered as emergent. See *ibid.*, pp. 61f.

> constellation is know, what is specially vital may elude the piecemeal application of the methods of physics and chemistry…If the study of life is not one with a peculiar subject-matter, though that subject-matter is resoluble without residue into physico-chemical processes, then we should be compelled ultimately to declare…psychology to be a department of physiology, and physiology of physics and chemistry.[21]

To say this, however, is not to say that Alexander's account is a form of de facto reductionism. It is not; he is clear that the reality of emergent qualities cannot be fully explained – neither in their own terms nor in the terms of reductive physicalism. In this sense, Alexander's view must be distinguished from those similar sounding contemporary accounts of emergence that consider emergent properties as those which arise as a result of the achievement of a certain level of complexity. This view holds that, whilst the whole is indeed no greater than the sum of its parts, under certain conditions particular combinations of parts can yield properties which cannot be derived from a consideration of those parts in isolation. Examples of emergent qualities and behaviour so understood can be drawn from a wide and interdisciplinary area, such as the organisation of ant or bee colonies and the flocking and shoaling behaviour of birds and fish, the dynamics of traffic flow and the growth of cities, and the structure of complex systems and the fluctuations of stock markets.[22] Essential to these accounts is the notion of organisational complexity. Once an entity or system reaches a certain level of structural or organisational complexity, the individual elements that make up that entity or system start to interact in ways that they do not when in isolation or in systems of lesser complexity. Such accounts are clearly very fruitful and there is obvious merit is analysing complex systems as complex systems rather than tirelessly reducing them to their constituent parts. However, whilst such an approach may be methodologically nonreductive, in the sense that it aims to treat complex wholes in their entirety as complex wholes, it is nonetheless hermeneutically reductive, in that it will still explain the properties and behaviour of that complex whole in terms of its constituent parts. As opposed to 'non-complex reductionism', it will consider those constituent parts in the context of their organisation and inter-relations; however, the explanation for the properties and behaviour of the whole will still be found in its parts. By contrast, Alexander will allow of no explanation for the emergence of the qualities of life and consciousness from the constituent parts of the complex organisations that he terms 'organisms', even as he declares that they can be understood without residue in material terms.

21 *ibid.*, II, pp. 62-63. Alexander is careful here to distinguish his position from J. S. Haldane's 'neo-vitalism'.
22 See Johnson *op. cit.*, (1).

ii. ontological emergence

a. C. D. Broad: beyond the mathematical archangel

In contrast to Mill and Alexander, C. D. Broad's presentation of the theory of emergence in his 1925 publication, *The Mind and its Place in Nature* (a reworking of his 1923 Tanner Lectures, whose benefaction significantly stipulates the theme as 'the relation or lack of relation between the various sciences') is a resolutely ontological account of emergence. For Broad, whilst it is undeniable that 'there is only fundamentally one kind of stuff' it is simply factually incorrect to assert that this single material is uniformly distributed and that the clearly apparent 'aggregates of various orders' have no distinctive and irreducible properties. This view, which Broad calls 'mechanism', is described as a 'magnificent ideal' and presented in its most extreme form as the belief that:

> [There] is one and only one kind of material. Each particle of this obeys one elementary law of behaviour, and continues to do so no matter how complex may be the collection of particles of which it is a constituent. There is one uniform law of composition, connecting the behaviour of groups of these particles as wholes with the behaviour which each would show in isolation and with the structure of the group. All the apparently different kinds of stuff are just differently arranged groups of different numbers of the one kind of elementary particle; and all the apparently peculiar laws of behaviour are simply special cases which could be deduced in theory from the structure of the whole under consideration, the one elementary law of behaviour for isolated particles, and the one universal law of composition. On such a view the external world has the greatest amount of unity which is conceivable. There is really only one science, and the various 'special sciences' are just particular cases of it.[23]

However appealing such a view may be, Broad argues that it is refuted by the empirical evidence of what he calls 'secondary qualities' or the specific properties displayed by complex groups. The denial of 'mechanism', however, does not commit Broad to a form of 'Substance Vitalism', such as that proposed by Hans Driesch, which is dismissed as inadequate largely on the basis of its failure to give a convincing account of the nature of 'the peculiar component' or entelechy. Rather, Broad proposes a third option – between 'Biological Mechanism' and 'Substantial Vitalism', namely 'another alternative type of theory, which I will call "Emergent Vitalism", borrowing the adjective from Professors Alexander and Lloyd Morgan'.[24]

23 Broad *op. cit.*, (4), p. 76.

24 *ibid.*, p. 58. For C. L. Morgan's distinctive contribution to the development of the concept of emergence, in particular through his theory of 'emergent evolution', which he presented as a third way between reductive materialist Darwinian evolution and the vitalist interpretations of Larmarck and Bergson's 'creative evolution', see Morgan (1912) *op. cit.*, (4); Morgan (1923) *op. cit.*,(4); Morgan, Conwy Lloyd *The Emergence of Novelty*, London: Williams and Norgate (1933) and Blitz

For Broad, 'emergent vitalism', or as he calls it elsewhere simply 'emergence', is the theory:

> …in abstract terms…[that] there are certain wholes, composed (say) of constituents A, B, and C in a relation R to each other; that all wholes composed of constituents of the same kind as A, B, and C in relations of the same kind as R have certain characteristic properties; that A, B, and C are capable of occurring in other kinds of complex where the relation is not of the same kind as R; and that the characteristic properties of the whole R(A, B, C) cannot, even in theory, be deduced from the most complete knowledge of the properties of A, B, and C in isolation or in other wholes which are not of the form R(A, B, C).[25]

In contrast to the mechanist understanding, the emergentist view affirms that the whole is greater than the simple sum of its parts, not however through the addition of extra substances or entelechies, but because of the context-dependent arrangement of particular sets of parts into particular wholes. He affirms:

> It is clear that in no case could the behaviour of a whole composed of certain constituents be predicted merely from a knowledge of the properties of these constituents, taken separately, and of their proportions and arrangements in the particular complex under consideration.[26]

The properties of a composed whole are, for Broad, unpredictable from and in excess of the properties of the constituent parts taken in isolation. However, Broad's claim here is more than simply that such properties of wholes exceed our descriptions of those of parts, such that a new kind of description – emergence – is required. Beyond such an epistemological account, Broad claims that within the ontological unity of reality, there are substantive differentiations on the basis of the aggregation of material into distinct orders. As he puts it:

> On the emergent theory we have to reconcile ourselves to much less unity in the external world and a much less intimate connexion between the various sciences. At best the external world and the various sciences that deal with it will form a kind of hierarchy. We might, if we liked, keep the view that there is only one fundamental kind of stuff. But we should have to recognise aggregates of various orders.[27]

For Broad, reality is understood – ontologically – to be composed not simply of atomistic entities, which are variously arranged and rearranged without diminishing their fundamental status, but more complexly of atomistic entities

op. cit., (4). For a more recent, if idiosyncratic application of emergent evolution, see Ashbrook, James and MacLean, Paul D. *Brain, Culture, and the Human Spirit: Essays from an Emergent Evolutionary Perspective*, Lanham: University Press of America (1993).

25 Broad *op. cit.*, (4), p. 61.

26 *ibid.*, p. 63.

27 *ibid.*, p. 77.

and aggregates of such entities forming irreducible and 'properly basic' 'orders'. These orders, or nonreducible arrangements of parts, are themselves considered to be arranged hierarchically, with lower orders understood as potential components of higher order compositions. The properties of the higher orders that cannot be reduced to those of the lower are described as emergent. Broad identifies three classes of properties of such higher orders: 'ordinally neutral', 'reducible', and 'ultimate' properties.[28]

As a result of this revised fundamental ontology, Broad proposes that there are two types of laws – 'intra-ordinal' laws, appropriate to the relations within orders, and 'trans-ordinal' laws, which are descriptive of the emergence of higher order properties from lower order components. Emergent properties are those described by trans-ordinal rather than intra-ordinal laws.[29] Even Broad's ideal agent, the 'mathematical archangel' (whose knowledge of intra-ordinal laws is considered superior even to that of Mr Rutherford) will be unable to predict the emergent properties of a specific higher order composition on the basis of its lower order components alone. Nonetheless, Broad is adamant that this unpredictability does not detract from the scientific nature of trans-ordinal laws or of the emergent properties they describe.[30]

In summary, for Broad, ontological emergence is the affirmation that a commitment to ontological reductionism is nonetheless compatible with the claim that specific wholes or complex systems (aggregates or orders) of physical material can have properties ('ultimate characteristics') in excess of the properties of their constituent parts.[31]

2. Emergence and religion

Having outlined the accounts of emergence held by three of its most prominent early defenders it is now possible to turn to the question of the relevance of their thought for theology. Six different accounts of the relation between the concept of emergence and Christian theology will be considered in turn.

28 *ibid.*, p. 78.
29 *ibid.*, pp. 77-78.
30 *ibid.*, p. 79.
31 It is, in Silberstein and McGeever's terms, a failure of the part-whole relation. Another way of putting this is that theories of ontological emergence view physical reality as 'uneven' or 'lumpy'. In contrast to atomistic materialism, for which reality at base is constituted by an 'even' or 'smooth' layer of constituent elements (the basic building blocks of all that is), ontological emergence asserts that there are some (and possibly a majority) of aggregates of constituent elements that once brought together cannot without loss be reduced back to their parts. In terms of the failure of part-whole reduction, ontological emergence is committed instead to a complex basic reality of parts and wholes. A further development of this view, which is not advanced by Broad, but would it seems be consistent with his account of emergence, would be a reversal of the part-whole reduction, in favour of a complex ontology of wholes and systems, according to which any divisions or identifications of constituent parts are ontologically secondary.

i. emergence has no relevance for theology

Not all the defenders of emergence consider that it has any positive applications to theology. Indeed, it is important to emphasise that most accounts of emergence are motivated by scientific or philosophical reasons quite independent of any theological concerns. Mill, for example, makes no claims to theological consequences of his understanding of emergence whatsoever. In common with by far the majority of the proponents of emergence, Mill considered his theory to be a scientific one of relevance only to the scientific and philosophical understanding of the world. In that it offers no contradiction to naturalism, emergence is theologically neutral.

ii. emergence is a Trojan Horse for theology

Others, however, have drawn theological consequences from their understandings of emergence that show its ambiguous status for theology. Broad, for instance, believed that whilst emergence was compatible with theism there was nothing in his revised ontology that could lend further support for the claims of theology. Indeed, he was more interested in the consequences of scientific research into the paranormal, which he believed should be taken more seriously by the scientific establishment and which, if verified, as he thought likely, would lend support to his theory. Indeed, Broad included evidence for human survival after death provided by the 'Society for Psychical Research' in *The Mind and its Place in Nature*, under the heading of 'Empirical Arguments for Human Survival' and claimed that it offered further justification for his understanding of the mind as emergent.[32] He clearly felt that a combination of prejudice and the limitations of reductive physicalism had led to such evidence being excluded from the canon of acceptable science. That an emergentist view was more amenable to such 'spiritual' evidence might be taken by some to be a fruitful theological application of emergence. Indeed, Broad seems to intimate such a view in his remarks in the 'Preface', in which he defends his inclusion of research into what he calls the 'supranormal':

> I shall no doubt be blamed by certain scientists, and, I am afraid, by some philosophers, for having taken serious account of the alleged facts which are investigated by Psychical Researchers. I am wholly impenitent about this. The scientists in question seem to me to confuse the Author of Nature with the Editor of Nature; or at any rate to suppose that there can be no productions of the former which would not be accepted for publication by the latter. And I see no reason to believe this.[33]

Interestingly, however, Broad himself did not hold that his account of emergence should be taken as having any positive consequences for theology; indeed

32 *ibid.*, pp. 614f.
33 *ibid.*, p. viii.

his embrace of the supernatural was largely at the expense of the established religion of Christianity. Peter Bowler reports that

> Broad had little interest in Christianity, however. In a 1939 article on science and religion – the debate over which had 'acquired something of the repulsiveness of half-cold mutton in half-congealed gravy' – he again introduced the evidence for survival after death, but argued that this was a Trojan horse for Christianity. The latest developments in science had made a basic theism more plausible, but if the evidence of the paranormal were accepted as credible, the miracles of Christ lost their unique status. Christ would have to be accepted as merely a gifted psychic, not the son of God.[34]

No friend of organised religion, Broad clearly felt that his theory of emergentism, when combined with a greater acceptance of the scientific evidence in support of the paranormal, would result in a decline in the support for Christianity.

iii. emergence and the possibility of theology

In contrast to Broad's scepticism, however, there have been those who have found support for the claims of Christian theology in the accounts of emergence, such as those outlined above. Primarily, the concept of emergence has been of theological interest to those seeking an alternative to reductive physicalism, widely perceived to be inimical to theology. As Nancey Murphy has claimed, in addition to its shortcomings as a scientific or philosophical theory, 'radical reductionism (reductive or eliminative materialism) is utterly unacceptable to the Christian'.[35]

Nonreductive physicalism aims to provide an account of reality that stands between both 'dualism (of one sort or another) and reductive (or eliminative) materialism'.[36] However, in order to be more than simply a statement of a theoretical possibility, nonreductive physicalism requires a mechanism by which the higher-level entities (or complex systems) can be said to arise from the lower-level entities (or simple units) of which they are nothing but the sum.[37] It is the concept of emergence that fulfils this role:

> Consciousness and religious awareness are emergent properties and they have top-down causal influence on the body.[38]

34 Bowler, Peter J. *Reconciling Science and Religion. The Debate in Early Twentieth-Century Britain*, Chicago: University of Chicago Press (2001), pp. 372-373, citing Broad, C. D. 'The Present Relations between Science and Religion', *Philosophy* (1939), 14, 131-154; 131 138-141. See also Broad, C. D. *Religion, Philosophy, and Psychical Research*, London: Routledge and Keegan Paul (1953).
35 Murphy, Nancey 'Nonreductive Physicalism: Philosophical Issues', In Brown, Murphy and Malony *op. cit.*, (2), pp. 127-148; p. 148.
36 *ibid.*, p. 127.
37 *ibid.*, pp. 139-143.
38 *ibid.*, p. 131.

Similarly Murphy uses the concept of emergence to account for the relationship between the different levels of complexity found within the human person:

> If we take the hierarchy of levels to include the moral and the social (with its political, economic, legal dimensions) we can see that we will have here a vast array of concepts that most philosophers would agree are not logically reducible to neurological variables…In Warren Brown's terms, there are emergent levels as we go from the neurological to the cognitive, to the interpersonal, to the political, economic, and legal, to the moral, and finally to the spiritual. While all of human behavior supervenes on the biological (genetic and neurological), little of it is reducible to biology.[39]

For Murphy, the concept of emergence enables her to account for the hierarchy of properties and levels characteristic of complex organisms (or composite wholes or systems), such as the human person. Emergence is, accordingly, a subsidiary tool within the wider philosophical position of nonreductive physicalism. Emergence is, for Murphy a central plank of her theologically inspired yet essentially philosophical negation of reductive physicalism and the articulation of a nonreductive alternative able to do full justice to the rich multilayered nature of physical reality.[40]

Interestingly, there is much in the contemporary discussion of emergentist nonreductive physicalism that is shared with the epistemological accounts of Mill and Alexander. Emergentist nonreductive physicalism is, on this view, presented as a scientific theory of how best to describe reality. According to such an account, in contrast to the explanatory imperialism of the physical sciences, the autonomy of the special science of theology (amongst others) is preserved alongside the reductive natural sciences. Just as with Mill's heteropathic descriptions and Alexander's pious dogmatism, such a view uses emergence as a way of justifying the independence and complementarity of theology. The limits of the secular sciences are firmly established and the domain of theology is secured from further attack.

However, like all exercises in damage limitation, this approach carries with it the possibility that, like Mill's chemistry, the realm of the theological will not remain impregnable to the continued advances of reductive materialism. Emergence may well be a persuasive means of accounting for those properties of material reality that cannot at present be included within the reductive framework; it is, however, naïve to believe that it will be sufficient to withstand

39 *ibid.*, pp. 137-138.It is important to note, at this stage at least, that Murphy does not carefully distinguish between supervenience and emergence, and indeed seems at times to use the terms interchangeably as synonyms.

40 It is interesting to note that the concept of emergence seems to be occupying an increasingly central place in Murphy's thought, raising the possibility that her use of the concept may, in her forthcoming work, extend beyond that of a subsidiary tool to that of a replacement for the theoretical framework of nonreductive physicalism.

the ongoing force of the disenchantment of the world. More seriously, however, is the possibility that the prize of the autonomy of the special science of theology is purchased at the cost of theology's effective isolation. To identify and defend a particular sphere as the theological is, in effect to remove theology from its vital engagement with the world, in particular the world of the natural sciences. Such a theological positivism might well preserve the legitimacy of theology at the same time as it does away with its relevance.[41]

To what extent these weaknesses can be overcome by reference to an ontological, as opposed to an epistemological, understanding of emergence is an open question. If, as Broad argues, physical reality 'really' is composed of both irreducible wholes and parts, if there are properties of aggregated wholes that simply cannot be accounted for in terms of reductive natural sciences, and if religion is understood as such a property, then the legitimacy and relevance of theology (along with other 'higher-order sciences') seems secure. Emergence understood in ontological terms supports the view expressed by Murphy of the human being as 'a physical organism whose complex functioning, both in society and in relation to God, gives rise to "higher" human capacities such as emotion, morality, and spirituality'.[42] On this view, theology is the science of the emergent capacity of human spirituality (or religion) able to exist comfortably alongside other special sciences, such as psychology and ethics, as well as the physical sciences. As should be clear, such a metaphysical basis for the legitimacy of the science of theology would indeed provide a firmer foundation for its practice; it would not, however, alter the positivist 'alongsideness' that permits the coexistence of competing discourses whilst denying their integration.[43]

iv. the emergence of God

In his Gifford Lectures, Samuel Alexander presents an alternative application of emergence to theology, according to which God is understood in terms of emergence. Alexander's position, which might best be described as 'emergentist pantheism' is heavily dependent on Spinoza's substance monism. Accordingly, Alexander describes God (he prefers the term 'deity' for reasons that will be apparent) as the highest emergent level of the world.[44] Consistent with his epistemological account of emergence, Alexander understands the divine as the

41 Recall also the limitations Alexander's account of emergence placed upon the special science of psychology. See Alexander *op. cit.*, (4), II, pp. 62-63.
42 Murphy (1998) *op. cit.*, (2), p. 25.
43 A further objection, from the different direction, might be that such a theology is limited to the extent that it is determined by the prior science of philosophy which, as it were, assigns theology to its particular sphere.
44 Of course, this is not to imply that the physical world is the cause of God any more than it is the cause of the intermediary level of mind – rather deity is emergent from the physical world. Conversely, the world can be described as the lowest-order instantiation of the divine, in a similar way to which Spinoza's pantheism is more than simply the identification of God and the world, but the assertion that God and the world are distinct manifestations of the same substance.

highest emergent quality which arises at a certain point of complexity beyond the intermediate qualities of life and mind. However, true to his metaphysical agnosticism, Alexander is clear that the emergent God is not to be understood in any sense as an additional 'substance':

> As actual, God does not possess the quality of deity but is the universe as tending to that quality…Thus there is no actual infinite being with the quality of deity; but there is an actual infinite, the whole universe, with a nisus toward deity; and this is the God of the religious consciousness, though that consciousness habitually forecasts the divinity of its object as actually realized in an individual form.[45]

For Alexander, God is neither infinite being nor 'transcendent object' but the highest emergent quality of the universe as a whole. He claims that 'God is the whole universe engaged in process towards the emergence of this new quality, and religion is the sentiment in us that we are drawn towards him, and caught in the movement of the world toward a higher level of existence.'[46] Clearly, therefore, any attempts to 'prove the existence' of such a God would be nonsensical and indeed the only 'proof' of the reality of the emergent quality of deity that Alexander provides is our own faith in the moral character of the universe and our desire for righteousness. He acknowledges that such faith is merely speculative, but claims 'that the universe is pregnant with such a quality we are speculatively assured. What that quality is we cannot know; for we can neither enjoy nor still less contemplate it. Our human altars are raised to the unknown God.'[47] Clayton succinctly summarises Alexander's epistemological Spinozistic theism:

> 'God is the whole world as possessing the quality of deity. Of such a being the whole world is the "body" and deity is the "mind".' Alexander's metaphysic endorses a God who is in the process of coming to be: at one time there was no God, and now – to put it strangely – there is only partly God. No spiritual force set up the process in advance; instead, deity is radically dependent on the world. This 'finite God', he writes, 'represent[s] or gather[s] up into its divine part its whole body'. Alexander accepts, one might say, a verbal notion of God: the deity 'deisms' (his verb); and these 'deisings' or 'enjoyments of the God' are things that the world does. The world is the subject of these actions; it does them; but what the world does is to deify itself. God is verb only…[48]

For Clayton, such a position, whilst no doubt as 'God-intoxicated' as Spinoza's, is theologically unsatisfactory, in that it leads to the two-pronged 'divinization of humanity, and the finitization of God' characteristic of panthe-

45 Alexander *op. cit.*, (4), pp. 361-362
46 *ibid.*, p. 429.
47 *ibid.*, p. 247.
48 Clayton *op. cit.*, (2), pp. 167-168, quoting Alexander *op. cit.*, (4), p. 353.

ism.[49] 'Emergent theism' is, on this account, too immanentist to do justice to the theological requirements for divine transcendence. Despite Alexander's clear affirmations that the emergent quality of deity exceeds the terrestrial minds from which it emerges, his commitment to substance monism along with his agnostic description of the nature of deity lead to the conclusion that emergent theism cannot provide a sufficiently strong account of divine transcendence to satisfy the demands of orthodox theology. By way of defence of such a position, it might be remarked that the difference between emergence and transcendence need not be as absolute as Clayton seems to suggest; indeed it will surely be the challenge of emergent theism precisely to articulate an account of transcendence in emergentist terms (perhaps along lines suggested by Hegel in terms of an 'emergentist panentheism').

v. emergent panentheism

According to an emergent panentheist position, emergence is indeed descriptive of God and the relation between the world and God as a complex system of iterative interactions. For emergent panentheism, what might be understood as emergent from the world is not the existence of God but God's self-revelation through the human capacity to know God.[50]

More than simply the affirmation of the need to adopt an emergentist anthropology, emergent panentheism takes the further step of describing the relationship between God and humanity as itself emergent. Beyond an anthropological application of emergence, such a view aims to articulate a theology in emergentist terms, in which religion (or the capacity to receive and accept the divine presence in the world) is based upon the understanding of God's revelation as emergent. Drawing on the Hegelian understanding of the dialectical self-expression of God through the history of consciousness, this position is an emergentist reformulation of the panentheist view of God as both present to the world and yet simultaneously exceeding it.[51]

49 Clayton *op. cit.*, (2), p. 168. In her 'Foreword' to the 1966 edition of *Space, Time, and Deity*, Dorothy Emmet notes that Alexander 'spoke of himself as an "Ottoman," i.e. a sympathizer with Rudolf Otto's view of religion as stemming from feelings of reverence for the holy, rather than from explicit moral and theological beliefs'. She goes on to quote a letter from Alexander's old friend, Claude Montefiore, which 'contained *le mot juste*: "You do walk humbly indeed with your funny God."' Alexander Samuel *Space, Time, and Deity*, 2 vols., 2nd edn. with Foreword by Dorothy Emmet, London: Macmillan (1966), pp. xvii, xix.

50 I hope to expand upon his position, which is only very briefly outlined here, in future writings.

51 This position shares some central features with the view put forward by Arthur Peacocke, who claims that the ontological distinction between God and the world pervades the totality of the world, such that God is present to the whole of reality in precisely the same moment that He exceeds it. See Peacocke, Arthur *Creation and the World of Science*, Oxford: Clarendon (1979, repr. 2004) and *Theology for a Scientific Age,* enl. edn., London: SCM Press (1993), pp. 371-372. Interestingly, Philip Clayton has been a prominent defender of the legitimacy of a panentheist interpretation of the Christian concept of God, such that he might be expected to embrace a position similar to that identified here as 'emergent panentheism'. See Clayton, Philip *God and Contemporary Science*, Edinburgh: Edinburgh University Press (1997), pp. 357ff; 'The Case for Christian

It is important to stress that this view differs from Alexander's Spinozistic monism, according to which 'deity' is described as an emergent quality of the world. By contrast an emergent panentheism describes God's transcendent coming-to-be through his immanent self-realisation in the world (and our response to that divine revelation in the form of religion) in emergentist terms. Whereas for Alexander, emergence provides the conceptual framework of theology – his theology is determined by his emergentism – for an emergent panentheism, emergence provides a heuristic conceptual formulation for theology; one which has the advantage (over explicitly Hegelian formulations) of being grounded in the natural sciences.

vi. a theology of emergence

Philip Clayton presents his own 'theology of emergence' as an attempt to take the demands of divine transcendence seriously, yet to remain within an emergentist framework. For Clayton, Alexander's proposals, whilst fundamentally unacceptable, are nonetheless helpful in framing the question of the possibilities for theology (in the narrow sense of the science of God) raised by emergence:

> …the success of the sciences of emergence… raises the interesting question: is the emergence of deity the only plausible metaphysical response to the new sciences of emergence? Or are there other conceptual responses that are consistent with these results? Finally, is any form of non-naturalist metaphysics still a live option in response to an emergent world?[52]

Clayton answers his own questions in the affirmative, albeit in an extremely cautious and speculative manner. The demand as he formulates it is:

> that one conceive mind (or spirit or deity) not merely as an emergent quality of the natural world, but also as a source of agency in its own right. It is most plausible to conclude either that the attributes generally associated with deity are not instantiated – they are not true of any object or objects – or that they are true of an entity or dimension that is not identical with the universe or any of its parts. This entity or dimension, even if it encompasses or includes the universe in its being, transcends it as well.[53]

Emergence does not provide an easy answer to the hard questions of theism, in particular the question of articulating the possibility of a transcendent mind (i.e. of a non-naturalist metaphysics). What is required instead is an admission that it is unavoidable that 'as soon as one affirms the existence of a God who

Panentheism', *Dialog* (1998) 37, 201-208 and *The Problem of God in Modern Thought*, Grand Rapids: Eerdmans (2000), pp. 82-124. See also the collection of essays edited by Clayton and Peacocke, Clayton, Philip and Peacocke, Arthur (eds.) *In Whom We Live and Move and Have Our Being: Panentheistic Reflections on God's Presence in a Scientific World*, Grand Rapids: Eerdmans (2004).
52 *ibid.*, p. 169.
53 *ibid.*, pp. 182-183.

does not depend upon the existence of the physical world, has one not already advocated a position that is, at least in this respect, irreducibly dualistic?'[54]

The dualism referred to is that between God and the world, rather than between mind and body.[55] For Clayton, emergence does not help us to describe the nature of God; but it is central to his understanding of the world to which God relates as creator and sustainer and as a consequence to his rethinking of the nature of divine action. Through the application of the concept of emergence, Clayton argues that the 'human person, understood as integrated self or psychological agent-in-community, offers the appropriate level on which to introduce the possibility of divine agency'.[56] In contrast to alternative accounts of God's relation to the world, Clayton argues that it is only on the basis of such an emergentist anthropology that 'a divine agency could be operative that could exercise downward causal influence without being reduced to a manipulator of physical particles or psychotropic neurotransmitters'.[57] At the same time, he continues, 'only an influence that worked at the level of the person as such could influence the kinds of dimensions that are religiously significant without falling into the level of magic'.[58]

Clayton's account of divine action is by his own admission incapable of providing a comprehensive explanation 'in human-scientific terms how it is that God affects the person as such', however it does have the clear virtues of being true to both the theological demands for divine transcendence and the scientific view of human nature. In contrast to Alexander's full-blooded reformulation of theology in terms of emergence, such that the concept of God is effectively reduced to that of an emergent property of the world, Clayton's theological appropriation of emergence is more limited. His is the application of the concept of emergence to theological questions; emergence does not transform theology, on this model, but is integrated into it.

Conclusion

The application of the concept of emergence to religious and theological concerns is becoming an increasingly prominent focus of attention in contemporary writings in science and religion, in particular amongst those influenced by or trained in the philosophy of science. As emergence becomes more widely defended in the philosophical and scientific literature, so the potentials of the

54 *ibid.*, p. 187.
55 As he writes, 'I have advocated accepting the second horn of the dilemma [mind-body dualism or God-world dualism], interpreting mind as in continuity with the natural world – in part because it preserves the possibility of neuroscience, and in part out of the conviction that, if one has to countenance some measure of dualism, the relation between an infinite God and a finite world is the right place to locate it.' *ibid.*, p. 187.
56 *ibid.*, p. 198.
57 *ibid.*, p. 198.
58 *ibid.*, p. 198.

concept for theology will be further explored. This article has offered a long view of the history of the concept of emergence and its significance for religion and theology through reconstructions of the accounts of emergence of three philosophers from the 'first and second phases' of the development of the concept and of their relevance to more recent applications of emergence to theology. What has become clear is the variety of ways in which the concept of emergence can be formulated, in particular the contrasts between Mill's and Alexander's epistemological accounts as opposed to Broad's ontological version and further the diversity of the ways in which emergence can be applied theologically. At the risk of confusing matters by introducing yet another typology, it might be helpful to characterise these theological engagements with the concept of emergence as 'strong' or 'weak', according to the strength of the role emergence plays in determining the shape of the resultant theology.

The first two – the weakest versions – clearly show the ambiguous nature of the concept of emergence for religion. For Mill, as for most of the contemporary theorists of emergence, there are no theological consequences to be drawn from the concept of emergence. Emergence is simply a descriptive term, appropriate to the scientific explanation of certain features of reality that cannot be adequately accounted for on the basis of explanatory reductive materialism alone. Secondly, by contrast, Broad did draw theological consequences from his understanding of the reality of emergent properties. However, far from offering unambiguous support for theology, Broad's conclusions show that the concept of emergence can be applied theologically to the detriment of religion. For Broad, emergence strengthens the belief in alternative, non-religious interpretations of spirituality, which he argues have better scientific justification than those of traditional religions. For those who do find positive theological consequences in emergence, the weakest formulation is that of Nancey Murphy, whose emergent nonreductive physicalism serves as the basis for the possibility of theological enquiry. For Murphy, the importance of emergence is its ability to articulate a scientific defence of the legitimacy of theology and to provide a way of justifying the reality of religion. Emergence enables theology, without however itself being a characteristic of theology.

By contrast, Philip Clayton gives a stronger account of the nature of the relation between emergence and theology by effectively predicating his theology on the basis of an emergentist anthropology. For Clayton, emergence does indeed have a role to play within theology as descriptive of the nature of the human person able to receive and relate to the transcendent God. A further, stronger version of Clayton's position is 'emergent panentheism'. According to emergent panentheism, the concept of emergence is of fundamental importance to theology, in that it is descriptive of the relation between God and the world; theology is itself emergent, in the sense that the ability to know God is understood to be an emergent property of the created world, infused with God's creative spirit. Theology, inasmuch as it is a return to God, articulates the emergent relationship of the divine present to the world and yet simultaneously exceeding it. Whilst Clayton himself has not (yet) developed such a view,

it is arguably consistent with his basic premises. Finally, the strongest application of emergence to theology is Samuel Alexander's 'emergent pantheism' that understands God as an emergent quality of the world. For Alexander, emergence not only plays a role within theology, it determines it.

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