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ARTICLE

SPACE, TIME, AND SAMUEL ALEXANDER

Emily Thomas

Super-substantivalism is the thesis that space is identical to matter; it is currently under discussion – see Sklar (1977, 221–4), Earman (1989, 115–6) and Schaffer (2009) – in contemporary philosophy of physics and metaphysics. Given this current interest, it is worth investigating the thesis in the history of philosophy. This paper examines the super-substantivalism of Samuel Alexander, an early twentieth century metaphysician primarily associated with (the movement now known as) British Emergentism. Alexander argues that spacetime is ontologically fundamental and it gives rise to an ontological hierarchy of emergence, involving novel properties such as matter, life and mind. Alexander's super-substantivalism is interesting not just because of its historical importance but also because Alexander unusually attempts to explain *why* spacetime is identical to matter. This paper carefully unpacks that explanation and shows how Alexander is best read as conceiving of spacetime as a Spinozistic substance, worked upon by evolution.

KEYWORDS: Samuel Alexander; super-substantivalism; evolutionary emergentism

1. INTRODUCTION

> 'But if the reality in its barest character is Space-Time, the face of the whole universe is the totality of all those configurations into which Space-Time falls through its inherent character of timefulness or restlessness. The stuff of reality is not stagnant, its soul's wings are never furled, it strikes out fresh complexes of movement, created things.'
>
> (Alexander, 1921a, 42)

Super-substantivalism is the thesis that space, or spacetime, is identical to matter. Historically, it has arguably been defended by Plato, Descartes and Spinoza; today, it is considered to be (at least) a live option by Sklar (1977, 221–4), Earman (1989, 115–6), Lewis (2001, 76), Sider (2001, 110), Schaffer

(2009), Effingham (2009) and Morganti (2011).[1] This paper investigates the historical super-substantivalist system of Samuel Alexander.

In the early twentieth century, Alexander's comprehensive and unique metaphysical system was well discussed, and it may even have influenced American process philosophy.[2] Today, some recent scholarship has discussed Alexander's account of how mind emerges from matter,[3] but his super-substantivalism has been entirely neglected. This paper will address that neglect, focusing on the very of heart Alexander's metaphysics: the process whereby matter emerges from space and time. I argue that the best way of understanding this process is to read Alexander through a rationalist lens, and to make explicit the implicit intimations in his work towards evolutionary theories. We will see that Alexander's super-substantivalism is of interest not just because of its historical import but also because he tackles a question that many other super-substantivalists do not: Alexander does not just argue that matter is identical to spacetime, he also offers an explanation as to *why* that is. To illustrate, consider an analogous case in the philosophy of mind: many materialists argue that mind and brain are identical, but few offer an explanation as to why that is (if pressed, perhaps they would refer to biological explanations of consciousness as an evolutionary development). Alexander posits an ontological hierarchy of emergence in which space and time produce qualities of increasing value and complexity, including matter, life, mind, and deity. Alexander claims that his system solves one of the criticisms dogging Spinoza: the problem of how

[1]For super-substantivalism in Plato and Descartes, see Graves (*Conceptual Foundations of Contemporary Relativity Theory* (Cambridge, MA: MIT Press, 1971)); for super-substantivalism in Spinoza, see Bennett (*A Study of Spinoza's Ethics* (Cambridge: Cambridge University Press, 1984), 89–92). Of the contemporary super-substantivalists, Schaffer ('Spacetime as the One Substance', *Philosophical Studies*, 145 (2009): 131–48) appears to regard Alexander's system as a direct predecessor of his own.

[2]Alexander had a significant influence on Alfred North Whitehead (*Process and Reality* (Great Britain: Cambridge University Press, 1929)), who founded the American school of process philosophy – see his *Process and Reality* (1929) – which includes Charles Hartshorne and Paul Weiss. Emmet reports Alexander saying modestly of his work that he 'had but rung the bell' for Whitehead (Emmet, 'Time is the Mind of Space', *Philosophy*, 25 (1950): 22–34). For more on American process philosophy, see Rescher (*Process Metaphysics* (USA: State University of New York Press, 1996)).

[3]See the very brief treatments in Stephan ('Emergence – a systematic view of its historical facets', in *Emergence or Reduction?* edited by Ansgar Beckerman, Hans Flohr and Jaegwon Kim (Berlin: Walter de Gruyer, 1992), 30–2), McLaughlin ('The rise and fall of British Emergentism', in *Emergence or Reduction?* edited by Ansgar Beckerman, Hans Flohr and Jaegwon Kim (Berlin: Walter de Gruyer, 1992), 66) and O'Connor and Wong ('Emergent Properties', in *Stanford Encyclopaedia of Philosophy*, edited by Edward N. Zalta 2012); a fuller investigation is Gillet ('Samuel Alexander's Emergentism: Or, Higher Causation for Physicalists', *Synthese*, 153 (2006): 261–96) and an older discussion is Emmet (1950). More general studies of Alexander can be found in McCarthy (*The Naturalism of Samuel Alexander* (USA: Macmillan & Co, Ltd, 1948)), Stiernotte (*God and Space-Time* (USA: Philosophy Library, 1954)), Brettschneider (*The Philosophy of Samuel Alexander* (USA: Humanities Press, 1964)) and Weinstein (*Unity and Variety in the Philosophy of Samuel Alexander* (USA: Purdue University Press, 1984)).

an undifferentiated, infinite substance can give rise to differentiated, finite modes.

The paper will proceed as follows. Section 2 will put the arguments of Alexander's *Space, Time, and Deity* (1920) into their philosophical context. As Alexander rejected idealism in favour of realism and naturalism – in that he aimed to give a 'physical' system compatible with contemporary science – he is regularly described as a 'new realist' akin to Russell. However, Alexander could be equally well described as a British Hegelian. I will then lay out what I take to be Alexander's central argument for super-substantivalism. Section 3 investigates this argument and considers its three premises in turn. Section 3.1 explains Alexander's claim that space and time are unified as a four-dimensional spacetime manifold. Although this claim is compatible with the physics of his day, we will see that Alexander also has deep metaphysical reasons for making it. Section 3.2 unpacks Alexander's claim that 'Motion' – a concrete substance-like entity – is identical to space and time; I argue that this difficult idea is best expressed by juxtaposing it with elements from Spinoza. Section 3.3 examines Alexander's claim that matter emerges from Motion. This process of emergence occurs as the result of a 'nisus' – a telos, or striving – in Motion. Amongst Alexander scholars there is debate as to how this notion should be understood. I provide a new reading of nisus, as an evolutionary principle working across spacetime. Darwin tells us that organisms strive for survival, and evolution occurs through natural selection. Some evolutionists go beyond Darwin, and understand evolution not just as process but as *progress:* the constituents of the world are not just continually striving and changing, they are also increasing in complexity and worth. I argue that Alexander conceives nisus in this light: the nisus of Motion is the evolutionary progress – worked upon by natural selection – towards deity. With this understanding of nisus, Alexander's claim that matter emerges from Motion becomes clear, and we are in a position to understand his conclusion that matter emerges from spacetime. In Section 4, I offer some final thoughts.

2. SPACE, TIME, AND DEITY

The thesis that space and time are ontologically fundamental is present in Alexander's earliest work. In one of his first publications "Hegel's Conception of Nature" (1886) Alexander explores how Hegel's understanding of nature and organism relates to contemporary science, especially the theory of evolution. Of particular relevance to us is Alexander's characterization of Hegel's conception of space (Alexander, 1886, 503):

> [M]atter is not that which comes first in the logical order of mechanical nature. That beginning is the complete and soulless self-indifference of nature which is Space. Space and Time together are abstract self-externality. They involve

> each other and combine to produce Motion, the soul of the world, which precipitates matter in its process.

Arguably, this characterization of Hegelian space is an early expression of Alexander's *own* developed view. Certainly, the claim that space and time involve each other to produce Motion, which in turn precipitates matter, is central to the system that Alexander offers us over thirty years later. Other Hegelian aspects of Alexander's system have been noted, and these – further supported by Alexander's lifelong correspondence with various British idealists, including A. C. Bradley, F. H. Bradley and Bernard Bosanquet – have led some commentators to paint Alexander as a British Hegelian.[4] Of course, given Alexander's realism and naturalism – he rejects idealism and argues that the empirical character of existences and laws is the subject matter of the special sciences (Alexander, 1914, 282) – he has also been grouped by historians with the early analytic philosophers Bertrand Russell and G. E. Moore (which is not to say that the Cambridge realists drew overmuch from Alexander, or vice versa). Alexander's commitment to naturalism is borne out by the way he incorporates developments in the physics of space and time into his mature system. And, as we will see below, by the way he applies Darwin's theory of natural selection as well.

Despite his prima facie anti-Hegelian commitment to realism and naturalism, Alexander is never swayed from his advocacy of the view he takes to be Hegel's. This reaches its full expression in Alexander's two-volume *Space, Time, and Deity* (1920). At its heart the thesis that spacetime is fundamental, and matter – followed by everything else – emerges out of it. Alexander does not give his argument in premise form but I have formulated it as follows.

(P1) Space and time are unified as the four-dimensional spacetime manifold
(P2) Motion is identical to space and time
(P3) Matter emerges from Motion
(C) Matter emerges from spacetime

[4]For example, in his vintage history of philosophy, Passmore writes that while *Space, Time, and Deity* has the new realism 'behind it', it is 'by no means unaffected by Bradley and Bosanquet' (Passmore, *A Hundred Years of Philosophy* (Great Britain: Gerald Duckwork & Co, Ltd, 1957) 267). In his rather more recent history, Mander goes so far as to describe the work of Alexander (and Whitehead) as a kind of idealism, albeit one of a very different stamp (Mander, *British Idealism* (Great Britain: Oxford University Press, 2011) 530). The same reading is found in more Alexander-centric scholars. For example, Brettschneider rages, 'He [Alexander] acts like Bradley and thinks like Bradley, but refuses to acknowledge the prepotency of the idealistic metaphysics in his Space-Time universe' (Brettschneider, 1964, 168–170). See also Weinstein (1984, 19) and Murphy ('Alexander's Metaphysic of Space-Time' [multiple parts], *The Monist*, 38 (1927): 358).

The argument is valid, although (to understate the case!) its premises stand in need of explanation. Below, I will discuss each of the premises individually, and show how Alexander reaches the conclusion that matter emerges from spacetime.

3. HOW MATTER EMERGES FROM SPACETIME

3.1. Space and Time are Unified as the Four-dimensional Spacetime Manifold

Of all the premises, (P1) is the most familiar. Space and time should no longer be understood as separate entities, but rather understood as unified in a four-dimensional manifold, spacetime. However, in the early twentieth century, this was still a new idea. Minkowski gave his famous speech in 1900 – 'Henceforth, space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality' – but it took time for his message to filter into the world of philosophy. Historically, many philosophers have not just treated space and time separately, they have also accorded space a more fundamental role in their ontologies. For example, Spinoza claims that while spatial extension is an attribute of God – it is what we perceive as constituting the very *essence* of the divine substance – time is merely a way of measuring finite durations and as such does not apply to God (more on this below). Whilst spatial extension is an attribute of reality, time is a way of measuring appearances that do not apply to reality. The 'new' idea that we should understand space and time combined as spacetime overthrew centuries of thought, and the implication that space and time should be treated symmetrically was no less radical. This explains Alexander's claim that in the early twentieth century we have only just begun 'to take Time seriously' (Alexander, 1921a, 15). Alexander was one of the first metaphysicians to take these new ideas into account, and he considers his conception of spacetime to be in accordance with physics. 'Our purely metaphysical analysis of Space-Time on the basis of ordinary experience is in essence and spirit identical with Minkowski's conception of an absolute world of four dimensions, of which the three-dimensional world of geometry omits the element of time' (Alexander, 1920i, 87). (P1) is rendered plausible and familiar in virtue of developments in physics.[5] But, as we will shortly see, Alexander's reasoning for making (P1) does not merely rely on this argument from physics; he also offers us a difficult metaphysical argument.

[5]For a fuller explanation of the transition from considering space and time independently to considering them as combined in the spacetime manifold, see Einstein (*The World As I See It* (Great Britain: John Lane, 1935), 179–81), who explains how the transition came about as a result of developments in electrodynamics and the relativity of simultaneity.

3.2. Motion is Identical to Space and Time

Whilst the preceding premise has the ring of familiarity, (P2) is entirely unfamiliar. Alexander expresses it as follows (Alexander, 1920i, 61–2).

> Space-Time is a system of motions, and we might call Space-Time by the name of Motion were it not that motion is in common speech merely the general name for particular motions, whereas Space easily and Time less easily are readily seen to be wholes of which spaces and times are fragments … It seems paradoxical consistently with the ordinary use of language to speak of a single vast entity Motion, though to do so is to do the same thing as to speak of Space-Time.

There is much to unpack here. As Alexander notes, we usually think of 'motion' in connection with particular motions: the movement of objects from one place to another. By the vast entity Motion, Alexander is not referring to the motion of any particular object, but rather to the spacetime system that contains such motions. This container is the 'system of motions', and it is Motion understood in this sense that is identical to spacetime. In order to understand the nature of this system, it will be helpful to look at Alexander's second argument in support of (P1). Although the success of this argument is questionable, the ideas underlying it will further elucidate Alexander's conception of Motion.

Alexander does not just support (P1) by making reference to developments in physics, he also seeks to provide us with a metaphysical argument as to why space and time are unified. Indeed, this argument seeks to show that space and time are merely distinguishable aspects of a single entity, spacetime. '[T]he mutual relation of Time and Space is so close and ramified that they cannot be considered as separate entities but only as the same entity described in terms of its different elements' (Alexander, 1920i, 57–8). Alexander's argument for this conclusion is lengthy and detailed; I give only the bones of it here. The argument hinges on Alexander's conception of how space and time would be if abstracted away from each other. He argues that time would become a mere 'now', incapable of succession; and space would become a mere 'blank', without distinguishable elements (Alexander, 1920i, 47). Alexander concludes that space and time are merely aspects of the same being. I will deal with each part of this argument in turn.

Alexander's understanding of time abstracted from space is best understood by looking at the way he suggests modifying Spinoza's system in light of his resolution 'to take Time seriously'. This suggestion is merely sketched in *Space, Time, and Deity* but in two later pieces – *Spinoza and Time* (1921a) and 'Lessons from Spinoza' (1928) – Alexander fleshes it out into a full 'gloss' of Spinoza's system.

In the *Ethics* (1677/1969) Spinoza argues that God is the only substance, and this substance has an infinity of attributes, of which we know two:

spatial extension and thought. All other existing things – human minds, mountains and stars – are merely dependent modes of God. Three further characteristics of God are relevant to this discussion. First, God is eternal. Eternity is existence itself, and God is the only being whose essence necessarily involves existence (*E*Id8 & *E*Ip20). God is *not* eternal in the sense that he endures unendingly through time, for time is understood in terms of possible lengths of duration of existence, and God necessarily exists[6] (*E*Ip19 & *E*IId5). Second, God is immutable. Spinoza links this characteristic to God's eternity; for example, God could not have created things other than in the order they are. '[I]n eternity there are no such things given as *when, before*, or *after*, hence it follows … he never can or could decree anything else than what is decreed' (*E*Ip33nii). Third, in so far as God is substance, he is homogeneous – he is spatially extended but lacks distinguishable parts (*E*1p15n). Spinoza's pantheism, combined with his claim that time, change and spatial variegation do not belong to the nature of God raises a serious problem. How can such a substance give rise to the created world of finite, temporal, changing and variegated modes? Alexander argues that this problem can be solved if Spinoza were to replace God's attribute of thought with the attribute of temporal duration. 'Life implies change and so does omnipotence; and change implies time' (Alexander, 1921a, 3). In other words, Alexander is arguing that if Spinoza did not construe God's eternity as 'timeless', but rather as 'time-full', he would be able to account for the variety of the world.

And this solution is only possible because, for Alexander, time is *change*. 'In our gloss upon Spinoza the ultimate reality is full of Time, not timeless but essentially alive with Time, and the theatre of constant change' (Alexander, 1921a, 38). The idea that time is intimately linked to change is an old and popular one; its advocates include Aristotle and Hegel.[7] How are we to understand the claim that time is change? Today, the claim is usually understood in light of McTaggart's discussion of temporal properties. McTaggart (1908, 459) argues that time is change in the sense that, if time really exists, then events must change their temporal properties. To illustrate, an event such as a wedding changes its temporal properties from being future, to present, to past. This account of how events are ordered is

[6]The clearest expression of this claim can be found in Spinoza's earlier work 'Cogitata Metaphysica' (I:4), included as an appendix to *The Principles of Descartes' Philosophy* (1663). See also the main body of Spinoza's *The Principles of Descartes' Philosophy* (Ip19).

[7]In his *Physics*, Aristotle provides an extended discussion of the relationship between change and time, concluding that 'every change and everything that moves is in time' (Aristotle, IV, 'Physics', in *The Complete Works of Aristotle Vol. I*, edited by Jonathan Barnes (USA: Princeton University Press, 1995) 222b30). This idea is at the heart of rationalist denials that God is in time: God is immutable, and if time is change, then God must be timeless. Hegel identifies time and change, or – to use his term – becoming. 'But it is not in time that everything comes to be and passes away, rather time itself is the becoming, this coming-to-be and passing away' (Hegel, *Encyclopaedia of Philosophical Sciences – Hegel's Philosophy of Nature* (Oxford: Oxford University Press, 1970) II, §258).

known as the A series; it is contrasted with the B series, which denies that events change their temporal properties and holds that events are merely temporally ordered as being earlier or later than one another. Alexander *may* be an A theorist[8] but, even if he is, this understanding of time as change is not robust enough to support his claim that Spinoza's substance would be spatially variegated if only it existed in time. Presumably, a homogeneous substance could exist in time and exhibit change in its temporal properties – it could have existed in the past and the present – without exhibiting spatial variegation. So why does Alexander take himself to have solved Spinoza's problem? The key to this puzzle may lie in Henri Bergson, whom Alexander credits as the first philosopher to take time seriously[9] (Alexander, 1920i, 44). In his *Creative Evolution* (1910) Bergson takes time not just to involve change but also *novelty*. '[D]uration means invention, the creation of forms, the continual elaboration of the absolutely new'[10] (Bergson, 1920, 11). I suggest that Alexander holds a similar view, in that time does not merely involve change in temporal properties, it also involves novelty – the creation of new forms – and it is this novelty which can transform a homogenous expanse of space into a variegated heterogeneous expanse. This reading of Alexander accounts for his belief that Spinoza could have solved the problem of how God could give rise to the world of modes, if only he had allowed that time – understood as change involving novelty – were also an attribute of the divine substance.

Building on this conception of time, Alexander argues that time cannot exist independently of space. Alexander writes that if time could be abstracted from space, it would 'consist of perishing instants ... there would be nothing more than an instant, a now, which was perpetually being renewed' (Alexander, 1920i, 45). For Alexander, time understood as unceasing change seems to entail that time lacks continuity: it can only provide immediate 'nows' or 'presents', it cannot provide an unbroken chain of continuity from the past to the present to the future. Broad takes umbrage with this in his critique of Alexander, describing this aspect of Alexander's argument as 'wholly invalid'. Broad objects that the 'togetherness' of the past, present and future is provided for merely by the *succession* of nows, a whole of related terms (Broad, 1921, 35). Whilst Alexander

[8]Alexander does not describe his metaphysics in terms of A or B theory, and his views on the issue are unclear. In *Space, Time, and Deity* Alexander frequently appears to be advancing an A theory; for example, he describes the 'displacement' of the present to the past (Alexander, 1920i, 61). And yet, in an undated manuscript 'The Reality of the Past' – held at John Rylands University Library (Manchester), reference ALEX/A/2/2/42 – Alexander firmly states that the notions of past, present and future only have meaning to our minds, not to the external world.

[9]In a striking case of blackened pots, Alexander adds that Bergson's description of the relationship between time and space is 'the most important and difficult doctrine of his philosophy and the most obscure' (Alexander, 1920i, 36).

[10]In classic style, Bergson continues, 'Real duration is that duration which gnaws on things, and leaves on them the mark of its tooth ... everything is in time, everything changes inwardly ... reality appears as a ceaseless upspringing of something new' (Bergson, 1920, 48–9).

would absolutely deny this objection, it is not clear how he would do so. This aspect of Alexander's system – that time, taken by itself, is an entity incapable of continuity – stands as an unjustified assumption.

Having seen how Alexander understands time abstracted from space, we turn to space abstracted from time. As is already evident from our discussion of Spinoza, Alexander conceives of space abstracted from time as *extension:* a homogenous expanse lacking distinguishable parts. 'Space taken by itself in its distinctive character of a whole of coexistence has no distinction of parts ... Space so far as merely spatial becomes a blank' (Alexander, 1920i, 47). This conception is sourced in various rationalist understandings – found in Descartes and Spinoza, and picked up to a degree by Hegel – of space as continuous, homogeneous spatial extension in three dimensions.[11] Alexander uses the fact that space abstracted from time lacks distinguishable parts to make the further argument that space could not exist without time. 'Space taken by itself ... has no distinction of parts ... [but that] turns out to be incompatible with the other empirical feature of Space, that it contains distinctness of parts' (Alexander, 1920i, 47). Alexander concludes that as the distinctness of parts is not supplied by space, it must be supplied by something else: 'There must therefore be some form of existence, some entity not itself spatial which distinguishes and separates the parts of Space ... Time' (Alexander, 1920i, 47). What is Alexander driving at here? The discussion is very quick, but it appears to refer to a remark made much earlier in the discussion, where Alexander describes our experience of spatial extension. 'Physical extension then is presented to us in experience as something within which bodies are placed and move, which contains distinguishable parts but is continuous' (Alexander, 1920i, 39). Even if we accept that we can perceive extension in the way that Alexander suggests, as an entity that exhibits distinguishable parts, that does not imply that extension cannot exist without distinguishable parts. Alexander's claim that space cannot exist independently of time must also stand as an unjustified assumption.

Parts of Alexander's *a priori* argument for (P1) are questionable, and in correspondence Alexander expresses his concern over this. In a letter to Broad dated 4 August 1920, Alexander discusses his claim that space and time are 'the one thing S-T [i.e. spacetime] from two sides'. Afterwards, Alexander adds, 'The fact is I have an obstinate belief that the proposition is true, but I also think it more than possible I have slipped in the proof'.[12]

[11]In his *Principles of Philosophy* (1644), Descartes claims that spatial extension is the attribute of material substance. For Descartes, continuous spatial extension in three dimensions simply *is* space, so Descartes identifies space and matter (II:10). As we saw above, Spinoza holds that insofar as God is extension, he is homogeneous: 'matter is the same everywhere, and its parts cannot be distinguished from one the other' (*E*Ip15n). In the *Encyclopaedia* Hegel also claims that space is 'absolutely continuous ... and contains no specific difference within itself' (Hegel, II, §253).

[12]Held at John Rylands University Library, reference ALEX/A/1/1/37/2.

Setting aside such concerns, our discussion of this argument has gone some way to explaining how Alexander conceives the relationship between space and time. Essentially, time provides space with *change*, and space provides time with *extension*. If time existed apart from space then there would be no continuum from past to future; this continuum can only be provided by space (Alexander, 1920i, 46). Conversely, if space existed apart from time, there would be only a partless homogeneous blank; the distinguishable parts evident within space can only be provided by time (Alexander, 1920i, 47). On Alexander's system, space and time are unified as a continuous, variegated entity that is spatially and temporally extended. On this understanding, spacetime is the 'theatre of perpetual movement' (Alexander, 1920i, 64). And it is *this* entity that Alexander calls 'Motion'.

In some respects, Alexander's Motion is similar to the Bradleyian Absolute. The idealist F. H. Bradley denies the reality of space and time altogether; he argues that bedrock reality is the unchanging, timeless Absolute.[13] Although Alexander and Bradley disagree on the reality of space and time, Motion and the Absolute have this much in common: they do not move or change, they simply exist. Having seen how space and time are identified with Motion, we will see below how matter emerges from it.

3.3. Matter Emerges from Motion

Alexander's emergentism has been the subject of recent scholarship,[14] and providing a full account of it would greatly exceed the bounds of one paper. Consequently, this section will *only* discuss Alexander's emergentism as it pertains to his super-substantivalism.

Emergence is the notion that novel properties 'emerge', or arise, out of more fundamental entities: the emergent entities may be identical to the base entities but they are not reducible to it. Alexander is one of the progenitors of (what has come to be called) British Emergentism, alongside C. Lloyd Morgan and C. D. Broad. One of the aims of emergentism is to explain the novel nature of mind yet place it within nature. Morgan – the first 'evolutionary emergentist' – integrates the notion of emergence with Darwinian evolution. He argues that emergence can be used to explain the 'genuinely new' things that sometimes occur in the process of Darwinian evolution, such as life and mind (Morgan, 1927, 1). It is important to note that on Morgan's understanding of emergence, the phenomenon has two aspects. The first aspect is 'logical', on which emergence is understood as a non-temporal, ontological hierarchy. For example, a being such as Socrates

[13]For Bradley's arguments against the reality of space, time and change, see his *Appearance and Reality* (1893), Chapters 4 and 5.

[14]Brief discussions can be found in Stephan (1992, 30–2) and McLaughlin (1992, 66); Gillet (2006) is more comprehensive.

is at any given time a hierarchy of qualities: he may be a lump of matter, but he is also a living organism and a mind. In contrast, the second 'temporal' aspect understands emergence as a process which takes place across time. As time moves forwards, novel things emerge. Alexander's emergentism draws on Morgan's,[15] and not least in that his understanding of emergence also exhibits a logical and a temporal aspect.

In contemporary metaphysics, the nature and reality of emergence is extremely controversial. However, Alexander appears to take the reality of life emerging from matter, and mind emerging from life, as empirical fact; he argues that this is the same process of emergence at work in the emergence of matter from Motion.[16] This paper will not attempt to investigate Alexander's claims regarding the emergence of life and mind; I will merely highlight two general points concerning emergence that apply to Alexander's claims regarding the emergence of matter. The first point is that the emergence of new qualities only occurs when existents reach a sufficient level of development or complexity.[17] The second point is that the emergents are identical with that from which they emerge. To illustrate using the mind and body, although when the brain reaches a certain level of complexity the mind emerges with a new quality – consciousness – that the brain does not have, the mind and brain are still one thing, rather than two. This explains the apparent co-location of mind and body. 'That which as experienced from the inside or enjoyed is a conscious process, is as experienced from the outside or contemplated a neural one' (Alexander, 1920ii, 5). Matter emerges from space and time, and matter is identical to spacetime; this is why Alexander's system is a form of super-substantivalism.

Even *if* we assume that emergence as understood by Alexander is unproblematic, how are we to understand the claim that matter emerges from Motion? Again, the answer lies in Alexander's understanding of the

[15]Alexander and Morgan corresponded frequently. Alexander explains that he has even chosen the term 'emergent' after the example of Morgan (Alexander, 1921ii, 14). In 1921, Alexander cites Morgan's *Instinct and Experience* (1912) but the full expression of Morgan's emergentism can be found in his later *Emergent Evolution* (1923). Morgan begins this latter book with a critique of Alexander's emergentism.

[16]Emmet concurs with this reading of Alexander and attacks this strategy, objecting that when giving a general worldview in terms of an analogy drawn from a special field – in this case the psycho-physical relation – it is necessary that the initial relation from which the analogy is drawn should itself be clearly understood (Emmet, 1950, 226). She argues that this relation is notoriously unclear, and worries that consequently Alexander's 'whole gigantic effort is an attempt to explain *obscurum per obscurius*' (Emmet, 1950, 227).

[17]For example, Alexander defines life as an 'emergent quality taken on by a complex of physico-chemical processes belonging to the material level, these processes taking place in a structure of a certain order of complexity' (Alexander, 1920ii, 61). The conscious mind further emerges – as 'something new, a fresh creation' – out of the living organism once the neural processes reach a certain level of development or complexity (Alexander, 1920ii, 7).

relationship between space and time. Above, we saw that time provides space with movement and change, and space provides time with extension. With change comes variety: a thing can only change – such as from being hot to being cold – if it is variegated. 'Time makes Space distinct and Space makes Time distinct' (Alexander, 1920i, 195). Whilst space abstracted by itself is a mere homogeneous blank, space unified with time is heterogeneous: it has parts that can be distinguished. Alexander describes these parts as complexes of spacetime, or groupings of motions. 'Space-Time falls of itself under the impulse of Time into these distributions of motion, into the complexes of bodies' (Alexander, 1921a, 72). All existents – including geometric lines, tables, human minds – are 'continuously connected groupings of motions', connected through spacetime with other such groupings (Alexander, 1920i, 183). When these individual motions become complex enough, a new quality emerges. 'The emergence of a new quality from any level of existence means that at that level there comes into being a certain constellation or collocation of the motions belonging to it at that level, and possessing the quality appropriate to it, and this collocation possesses a new quality distinctive of the higher complex' (Alexander, 1920ii, 45). Alexander simply takes the notion of emergence – as found in the emergence of life from matter, and mind from brain – and applies it to Motion. If individual motions within Motion become complex enough, they acquire the quality of matter; if they become more complex still, they acquire the quality of mind. And yet, any given complex of spacetime, and the matter that may emerge from it, is still one thing rather than two. Although Alexander speaks of matter emerging from Motion, he allows that this emergence may not be direct: there may be intermediate emergent qualities between them. 'There would be nothing extravagant in supposing that electricity or light, for instance, were a substance anterior to matter in the proper sense' (Alexander, 1920ii, 53).

Alexander's difficult claim that matter emerges (even indirectly) from Motion may be further elucidated using a non-Darwinian conception of evolution. In 'Progress: Its Law and Cause', Herbert Spencer argues that evolution is the process whereby homogeneous things become heterogeneous. '[T]he series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure' (Spencer, 1858, 2). Spencer goes on to describe how every germ 'consists of a substance that is uniform throughout' and as it progresses it exhibits 'differentiated divisions', which begin to 'exhibit contrast of parts' (Spencer, 1858, 2). He concludes that the first established truth of all is that every existing organism has developed from being simple to being complex (Spencer, 1958, 6). Spencer argues that this kind of progress – from the homogeneous to the heterogeneous – in biology in fact characterizes all forms of progress, from the development of the Earth to Art (Spencer, 1858, 3). Even after Darwin's theory of natural selection was published, Spencer's characterization of

evolution persisted[18] and it is evident in Alexander's early discussion of natural selection with relation to Hegel, where he describes evolution as 'the law of progress from indefinite incoherent homogeneity to definite coherent heterogeneity' (Alexander, 1886, 518). In Spencer's *First Principles* (1862), his fullest account of evolution, Spencer describes the evolutionary progress of matter: 'matter passes from an indefinite incoherent homogeneity to a definite coherent heterogeneity' (Spencer, 1880, 343). Replace 'matter' with 'Motion', and Alexander's theory is not far off. Through time, space evolves from homogeneity into heterogeneity and this is how matter emerges out of it.

Alexander's claim that matter emerges from spacetime has been the object of substantial criticism, and one complaint is made repeatedly. In an early discussion of *Space, Time, and Deity* Joseph Leighton objects that he fails to follow Alexander's claim that existents emerge from spacetime. 'Space-time is too abstract, too thin, too mechanical in the geometrical sense, to constitute the stuff of reality, a primal motion-stuff in which emerge, by its thickening up, all the higher orders of existence'[19] (Leighton, 1922, 236). However, I argue that – whilst there are many issues with Alexander's system – this particular complaint can be rebuffed. Remember, Alexander's understanding of space and time is partially sourced in the rationalist picture. For Descartes, spatial extension is the attribute of material substance. Depending on one's understanding of the Cartesian notion of attribute – for our purposes it makes no difference – extension either constitutes the nature of matter or it *is* matter. Pure extension in length, breadth and depth is homogeneous *substance*: it exists independently of everything except God, and it can support dependent entities such as modes. I suggest that Alexander's conception of spacetime is similar to Descartes's conception of space. For Alexander, spacetime is concrete – 'as concrete as body and life are in the organism' (Alexander, 1920i, 204) – it exists independently of all other things, and it can support dependent, emergent qualities. If one allows that body is substantial enough for mind to emerge

[18]Spencer certainly never gave it up in favour of natural selection. In his *Darwin and Hegel*, the evolutionary idealist D. G. Ritchie sarcastically suggests that Spencer attempts to 'patent' evolution, and points out that natural selection only appears as a footnote in Spencer's *First Principles*, a move 'intended to minimise the importance of Darwin's discovery' (Ritchie, *Darwin and Hegel* (London: Swan Sonnenschein & Co, 1893) 55). Despite Darwin, Spencer's characterization of evolution did persist. For example, in Morgan's 'The Philosophy of Evolution', he writes: 'The root ideas of the conception of evolution are, first differentiation, and secondly the interaction of the differentiated products' (Morgan, 'The Philosophy of Evolution', *Monist*, VIII (1898): 481–501). In this paper Morgan discusses both Spencer's and Darwin's theories of evolution; he finds Spencer's 'root idea' perfectly compatible with natural selection (indeed, if my reading of Alexander's notion of nisus below is correct, so does Alexander). It can also arguably be found in Bergson: becoming, via evolution, is the source of infinite variety (Bergson, 1920, 320).

[19]Similar related complaints can be found in McCarthy (1948, 107) and Hicks ('Review of Alexander's Space, Time, and Deity', *The Hibbert Journal*, XIX (1920): 573–81, 106).

out of it, then one should also allow that spacetime is substantial enough for matter to emerge out of it, for spacetime is just as substantial as body is. This reading of Alexander is confirmed here (Alexander, 1920i, 38):

> Space and Time are not merely the order of their coexistence or succession, but are, as it were, the stuff or matrix (or matrices) out of which things or events are made, the medium in which they are precipitated and crystallized; that the finites are in some sense complexes of space and time. In the language familiar from the seventeenth-century philosophy, things and events are 'modes' of these 'substances', extension and duration.

Alexander states that, strictly speaking, spacetime cannot be called a substance, for substances stand in causal relations to other substances, and due to the singular nature of spacetime this is impossible (Alexander, 1920i, 340). Spacetime cannot stand in relations to anything outside of itself because in order for that to be possible there would need to *be* something outside of itself, and there is nothing that is not contained within spacetime. This move is also reminiscent of Bradley: Bradley argues that the Absolute does not stand in relations to anything outside of itself (although, for Bradley, relations *within* the Absolute are also only appearances, not reality). However, Alexander accepts that spacetime is a substance in the loose sense that it is the 'substance of which includes all substances' (Alexander, 1920i, 341). As Alexander's Motion plays many of the same roles that the seventeenth century notion of substance does – for example, it exists independently of (all) other things and bears properties and qualities – it should be thought of as substance.[20]

Although this criticism of Alexander's claim that matter emerges from spacetime can be resisted, a deeper one is looming. In the quote above, Alexander writes that spacetime 'falls of itself' into new motions and complexes. This implies that the continual becoming of spacetime is sheer activity; whilst this idea is difficult, it is not objectionable within the confines of Alexander's system. However, Alexander *also* claims that this activity is directed towards some end. 'There is a nisus in Space-Time which, as it has borne its creatures forward through matter and life to mind, will bear them forward to some higher level of existence' (Alexander, 1920ii, 346). This citation is the first time that the term 'nisus' is introduced: it occurs towards the end of the second volume of *Space, Time, and Deity* and it is not explained (indeed, it is not even listed in the index). And yet, this notion of nisus has a hugely important role to play, for it appears to be responsible for the fact that Motion does not just give rise to matter but that it is at the base of an ontological hierarchy of increasing complexity and value. Accordingly, we must ask, what *is* the nisus of spacetime? The issue has divided

[20]Bergson says similarly of time: 'It is the foundation of our being ... the very substance of the world in which we live' (Bergson, 1920, 41).

commentators.[21] I offer a new reading of Alexander's notion of nisus, partly drawn from evolutionary emergentism.

The term 'nisus' has two aspects. The first aspect is that nisus is an effortful striving. The second aspect is that this striving has a *telos* – the striving is *towards* a goal. The first aspect of nisus, an effortful striving, can be found in Darwin's theory of evolution. At the heart of this theory is the idea that biological creatures struggle: the subtitle of Darwin's *Origin of Species* (1859) is 'The Preservation of Favoured Races in the Struggle for Life'. In its third chapter – entitled 'Struggle for Existence' – Darwin says the following: 'each organic being is striving to increase at a geometrical ratio; that each at some period of its life . . . has to struggle for life' (Darwin, 1968, 129). Of course, Darwin also argues that this struggle is worked upon by natural selection. Darwin defines natural selection as the process whereby variations useful in some way to each being 'in the great and complex battle of life' are preserved, for individuals bearing them are be more likely to survive and reproduce, and 'natural selection would thus have free scope for the work of improvement' (Darwin, 1968, 130–1). This process is both gradual and continuous, akin to the erosion of cliffs by coast-waves (Darwin, 1968, 142). It gives rise to divergence of character, for more living beings can be supported in the same area the more they diverge in structure, habits and constitution (Darwin, 1968, 170).

A similar idea to Darwinian evolution, that all biological organisms struggle and are worked upon by a process known as natural selection, is implicit in Alexander. Just as Alexander took the notion of emergence and widened its narrow application from the problems of life and mind to the universe, so also he appears to take the Darwinian notion of struggle and the process of natural selection from biology and applies it – analogously – to the entire universe. Other similarities between their theories exist too, such as the importance of time in Darwin's system – for evolution requires 'the long course of ages' – and the fact that, in both their systems, evolution is a continuous process. This may also provide part of Alexander's motivation for conceiving space as continuous (rather than discrete) expanse. This reading is confirmed by the way that Alexander describes his nisus as the *élan vital* of Bergson (Alexander, 1928, 27). Bergson maintains that there is an effort, 'an *original impetus* of life', which is sustained along the lines of evolution among which it gets divided (Bergson, 1920, 92). For Bergson, this Darwinian striving for survival – this impetus – is worked upon by evolution, and this encourages novelty. Alexander uses a

[21]For example, Stiernotte understands nisus as 'creative force' (Stiernotte, 1954, 285). In contrast, Brettschneider argues that nisus is a Bradleyian principle of coherence (Brettschneider, 1964, 154). Differently again, Emmet describes the nisus as a 'creative tendency' for complexes of one order to combine with each under suitable conditions to form complexes of the next order (Emmet, 1950, 232). She adds that nisus arises in Alexander's system because he assumes 'the mere fact of succession necessarily means creative advance' (Emmet, 1950, 232). Although she makes no mention of evolution, Emmet's reading comes closest to my own.

similar idea. Support for this reading of Alexander can be found in two sources.[22]

The first source is a paragraph in *Space, Time, and Deity*. In the context of considering the possibility that Motion might not give rise to matter directly, Alexander adds the following (1920ii, 54–5).

> If it is asked further by what steps it is that mere motion under the guiding hand of Time leads to the emergence of material complexes of motion which we find in the world of things . . . I can only reply that I do not know . . . [Yet] I dare to ask if there may not be in these ages of simpler existence something corresponding to the method pursued by nature in its higher stages, of natural selection . . . Whether that is to say, nature or Space-Time did not try various complexes of simple motions and out of the chaos of motion preserve certain types. The ground which justifies us in asking this question is that the beginnings of things present phenomena analogous to those of life; for instance, the organisation of atoms . . . in the observed transformation of atoms into atoms of other properties; all phenomena which suggest growth of a certain kind.

Here, Alexander leaves this idea as mere conjecture. However, in the second source – his later two pieces on Spinoza – he greatly expands upon it.

Alexander spends some time comparing his notion of nisus and Spinoza's conatus doctrine. Spinoza writes that, 'The endeavour wherewith a thing endeavours to persist in its being is nothing else than the actual essence of that thing' (*E*IIIp7). Alexander argues that conatus is best realized from considering organic creatures, such as the way plants and animals retain their individuality of being, abandoning it only to external violence or internal decay (Alexander, 1921a, 70). And yet, everything has a conatus: 'The atom persists in its being so far as the motions of its planetary system of electrons moving round their central nucleus are conserved' (Alexander, 1921a, 71). One way of understanding Alexander's gloss of Spinoza is to see that he is attributing a Darwinian striving to everything that exists, not just biological organisms. Alexander goes on to argue that, while for Spinoza these bodies arise out of divine substance by the 'edict of God', on his system they 'grow from one another in the order of time or as we say by evolution' (Alexander, 1921a, 71). Essentially, Alexander is arguing that just as everything has a nisus, so the process of evolution works on all things (Alexander, 1921a, 71):

> Space-Time falls of itself under the impulse of Time into these distributions of motion, into the complexes which are bodies . . . Yet nature infected with Time,

[22]Or three, if you count the rather suggestive line in a letter dated 10 April 1910 from Alexander to Bradley, held in the Merton College Archives (Oxford). In the context of explaining how mental process is continuous with the movement of the body, Alexander adds 'I am constantly using the notion at the bottom of natural selection'. Although the comment is left unexplained, what notion could Alexander be referring to, if not Darwinian striving? The implication is that even then Alexander was thinking of emergence in evolutionary terms.

> not as a disease but as its vitality, does not stop, but pushing on, evolves out of these stable forms fresh distributions and a new order of beings ... Experience shows us this evolution and science endeavours to exhibit the methods in detail by which the evolution is effected.

This is the best way of understanding the first aspect of Alexander's nisus. Space and time combine to produce Motion, a variegated spatial extension that is constantly becoming, undergoing change. All things within Motion have a nisus, a striving or struggle to survive. Just as the process of natural selection works on genetic quirks in biological organisms, it also works on quirks of Motion.

This first aspect of nisus – effortful striving – does not present a problem for Alexander's system; the idea that a process akin to natural selection works upon complexes of spacetime, such that matter emerges out of them, can be justified within its bounds. However, the second aspect of nisus – that the striving has a telos, it is goal-directed – does present a problem for Alexander's system, for it seems to stand as an unjustified assumption. Unlike Bergson, Alexander tells us that Motion has a nisus *towards deity*. '[T]he internal development of the world ... cannot be regarded as ceasing with the emergence of those finite configurations of space-time which carry the empirical quality of mind' (Alexander, 1920ii, 346). This idea – that Motion is not just striving worked upon by natural selection, that it also has a telos, an end point – is not present in Darwinian evolution. On a proper understanding of natural selection, the process merely explains why some species survive and not others; it lays down no strictures as to whether those that survive are of a higher complexity and value. Indeed, it seems perfectly plausible that natural selection has or will sometimes favour species of a lesser complexity or, say, intelligence. The problem is recognized – although it is put in different terms – by F. H. Bradley, who raises it in correspondence with Alexander. Although Bradley does not understand Alexander's nisus in evolutionary terms, he puts his finger on the same issue. 'Reality (as space-time) contains a ''nisus'', and seems essentially to be a progress, though you hardly attempt to justify this. A ''forward movement'' of Time is one thing, and a progressive ''nisus'' is surely another'.[23] If Alexander replied to Bradley's objection, the reply has not survived. As matters lie, Bradley's objection stands: the second aspect of Alexander's nisus – its telos – is unjustified.

Alexander argues that the universe is 'pregnant' with the higher quality of deity, which will emerge out of mind (Alexander, 1920ii, 347).

[23]Letter dated 28 April 1922, manuscript number Alex/A/1/1/33/17, held at John Rylands University Library. In the same letter, Bradley adds 'If you are further led to hold that this ''nisus'' to an end is also actually realised and accomplished and is not merely ''in progress'' – you have on your hands absolutely all the difficulties of Absolutism.' Happily for Alexander, he is not led to this further position and its concomitant difficulties.

Consequently, the emergence of matter from Motion is not merely the result of effortful striving, it is also end directed. Such a Hegelian teleology can be found in the idealist Bosanquet, who repeatedly uses the term 'nisus' to describe the striving of the finite self towards unity and self-completion within the world[24] (Bosanquet, 1913, 4). It can also be found in Morgan, who supplements Darwin's principle of natural selection with the further idea that natural selection favours complexity and 'valued' qualities such as intelligence and morality. As we saw above, it is Morgan who introduces the idea – *not* found in Darwin's theory of evolution – that evolution works not just across persisting things in time, but across levels of reality, and the higher the level the higher its richness (Morgan, 1927, 203). Morgan argues that there is 'a felt push' from the lower levels of one's being – analogous to Alexander's nisus – that draws one up to the higher levels and culminates in deity (Morgan, 1927, 209). The second aspect of Alexander's nisus should be understood not merely as process, but as progress. More controversially, it may be that Alexander's understanding of the first aspect of nisus – blind Darwinian striving – is supplemented by the second: nisus is Darwinian struggle *that is acted upon* by the process of natural selection, and this process produces not just change but progress. Just as we might supplement Darwinian natural selection in biology with the idea that there is a push from lesser complexity and value to greater; we might also supplement the analogous process of natural selection in spacetime with the further idea that there is a push towards greater variation, complexity and value. Out of this progress will emerge a quality of even great value and complexity than mind: deity.

Nisus is an ambivalent notion: on the one hand, it postulates a bare mechanical striving, and on the other it postulates a value-laden end goal. This ambivalence presents a much deeper problem for Alexander's claim that matter emerges from Motion than the objection that spacetime is too 'thin' to be the stuff of reality. The telos of nisus does not seem to have any origin in Alexander's naturalism; in the absence of any other explanation, it appears to be a rather neo-Hegelian principle.

4. CONCLUSION

The quote that opens this paper summarizes Alexander's system, rendering it both poetic and obscure. And yet, through careful excavation of the argument underlying Alexander's super-substantivalism, it can be seen that his system is neither so strange nor so mysterious as it first appears. Spacetime, the great container of motions, is at the centre of Alexander's system. These motions, continuous variegated regions of spacetime, increase

[24]Indeed, it is possible that Alexander choose the term 'nisus' after the example of Bosanquet; if so, this would provide yet another example of Alexander's neo-Hegelian leanings.

in complexity until wholly new qualities emerge that are collocated with them: material objects, living organisms and minds. The phenomenon of emergence is both logical and temporal: it gives rise to ontological hierarchies *and* it is a process which occurs across time. Alexander is giving us a cosmology as well as a metaphysics. Furthermore, this creative process is driven by a nisus, a striving which is governed by natural selection and yet possesses a telos. Alexander's system represents a far-reaching, thought provoking reply to the grand question of why our world contains the beings that it does – material bodies, living organisms and minds – and his super-substantivalist answer is worthy of renewed attention.[25]

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