AN INCOMPLETE DEFINITION OF REALITY

Boris DeWiel

ABSTRACT: A reality may be defined incompletely as a perpetuating pattern of relations. This definition denies the name of reality to an utter and totalistic patternlessness, like a primal patternless stuff, because a patternless all-ness would be indistinguishable from a patternless nothingness. If reality began from a chaos or patternless stuff, it became a reality only when it became patterned. If there are orders of reality with perpetuating relations between them, as in Cartesian interactive substance dualism, the definition allows us to say that these orders belong to a common reality by virtue of those relations. However, the definition is silent on the question of whether reality is ultimately pluralistic. Some suggestions are made about the possibility of stuffless patterns, including those of the physical world, but the definition is not dependent on the possibility of stufflessness.

KEYWORDS: Philosophy; Ontology; History of Philosophy

AN ECUMENICAL DEFINITION

Reality has made a comeback in recent years. A generation ago it was common in academic circles to hear about the 'social construction of reality', usually with at least the hint of a suggestion that there can be no such thing as reality prior to our creation of it. Today, however, we see realism returning even to the continental tradition as with the 'speculative' realisms of Meillassoux and others. According to Arun Saldanha, 'The recovery of philosophy's original Galilean relationship to the physical and mathematical sciences is especially urgent, after the linguistic turn, the fad of postmodernism, and the ensuing science wars have put such great stress on this relationship. At the very least, then, speculative realism is not just good news for science, but a possible platform for new ecumenical experiments across the debilitating fissures between continental and analytic philosophy'.[1]

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1 Arun Saldanha, 'Back to the Great Outdoors: Speculative Realism as Philosophy of Science', *Cosmos and History*, vol. 5, no. 2, 2009, p. 310.

In support of such ecumenicism, it may be helpful to offer a definition of reality that is sufficiently open, by virtue of its deliberate incompleteness, to be useful in a variety of discursive contexts without excessively limiting the sorts of realities to which it may be applied. For example, the definition offered here is ultimately silent on the question of the sorts of stuff, if any, of which reality may consist. This openness or incompleteness allows us to use a single overlapping term to describe the possibility of mental or ideational realities, physical or scientific realities, social realities, mathematical realities, aesthetic realities, imaginative realities, and so on. The device of incompleteness allows for the possibility of a pluralism of realities and thereby avoids the suggestion that some sorts of realities must be reducible to other sorts of reality. However, the definition also openly allows for the possibility of relations between different sorts of realities such that we may speak of overlapping realities that include those different sorts.

Definitions include and exclude. A complete definition includes all the attributes, properties or qualities of the thing to be defined and excludes all those that do not properly belong to it. An incomplete definition is one that specifies some of the attributes, properties or qualities that may be included and excluded but is silent about others that may or may not be. About such a notion as reality, a complete definition seems beyond us. However, an incomplete definition may nonetheless allow us to use the word meaningfully to discuss such questions as whether there is such a thing (or a pluralities of things) called reality and whether it (or they) may be created or are only ever discovered.

The incomplete definition offered here is that a reality is the perpetuation of a pattern. A pattern may be defined minimally as the perpetuation, in one or more ways, of one or more relations. A reality then, whatever else it may also be, must be a perpetuating pattern of relations. What these relations may be, and what the elements or parts may be that are related in a reality, are among the questions about which the definition is silent. The definition leaves open the possibility that the elements or parts of reality are themselves patterns of relations, perhaps even at the most basic level of reality. Perhaps reality is pattern all the way down. That possibility, which the definition allows for but does not require, is discussed below.

Just as a reality may consist of various kinds of relations, so may the ways of perpetuation be various. The word and its variants are usefully open in their meanings, though not vacuously so. As a verb, 'perpetuate' may be taken as either transitive or intransitive. The adjective 'perpetual' may be taken as a synonym for 'eternal' but it need not be taken in that way. Perhaps realities can be created that become perpetual, for example, without being eternal in the sense of uncreated. The

notion of perpetuation, while not utterly indeterminate in its meaning, is sufficiently open to allow for a variety of theories of reality to be included within the terms of the definition.

Some of the possible ways of perpetuation may involve temporality and spatiality but the definition is intended to be independent of any particular theory of time and space. If time and space are to be describable as belonging to the patterns of reality, they cannot be notionally foundational to the definition of reality. If time and space exist in (so to speak) reality, reality cannot be defined as that which exists in (literally) time and space. Hence a reality is not defined here as the patterns that perpetuate in time and space, though some patterns may do so; rather, time and space, if they are to be understood as real, must be included among the perpetuating patterns of reality.

Perpetuation may itself be a relation, as when one pattern has a causal or generative relation to another pattern. In such cases, 'perpetuate' becomes a transitive verb. However, a cause is not real if nothing is caused and nothing does the causing. Hence we may say of a given pattern of reality, if it includes the relation of causal or generative perpetuation, that it must also include a pattern of relations in addition to the relation of causality or generativity itself. Reality is the perpetuation of relations; it is not the perpetuation of perpetuation by itself. Self-perpetuation alone is not a reality because it lacks pattern.

If realities are created, the act of creation must be a relation of perpetuation between one reality and another. Creativity requires at a minimum a creator, a creation and a relation of perpetuation between them. A creator is not a creator unless it creates something beyond itself. Creativity without creation is not conceivable as a reality. A primal act of self-creation is conceivable only as the existential separation of the self into self-creator and self-creation. The latter must be an otherness; that is, a new existence. Creativity is the making of an existential difference. If nothing existentially new and different has been created, no act of creation has occurred. Hence a self-creator cannot be an unpatterned unity.

Also excluded is the possibility of a patternless stuff or material as real by itself. The central reason for this exclusion is that patternless stuff, hypothesized as existing totalistically by itself, must lack all distinctions, including the distinction between somethingness and nothingness. Such a stuff could become real only if patterns, including relations of distinction, were exogenously given to it. While by itself the distinction between real and unreal is inadequate to define reality beyond a double negation (a reality is not an unreality), nonetheless reality can have no meaning if that distinction is obviated. Stuff considered as existentially alone would lack any pattern of distinctions; hence a universal unpatterned somethingness would be

indistinguishable from a universal unpatterned nothingness. Similarly, a perfect Parmenidean oneness would be indistinguishable from a perfect nothingness since both, by excluding all distinctions, must lack the possibility of any distinction from each other.

Each alone is as unthinkable as the other. Nothingness is unthinkable not because it is stuffless but because it is patternless. Concepts are patterns; hence patternlessness is describable but not fully imaginable. Though unthinkable as a totality brought exhaustively to one's consciousness – to do so is not to think of nothing, it is not to think – nothingness may be defined as the total absence of all distinctions and all patterns. Indeed it should not be called no-thing, if the latter implies a distinction from some-thing. The *nihil* is not no thing; it is no pattern.

As Hegel pointed out, '*Being, pure being* … is pure indeterminateness and emptiness…. *Nothing, pure nothing*: it is simply equality with itself, complete emptiness, absence of all determination and content — undifferentiatedness in itself…. *Pure being* and *pure nothing* are, therefore, the same'.[2] Hegel's answer was to posit that nothingness and somethingness become meaningful only if 'Becoming', as the synthesis of 'Being' and 'Nothing', is taken as the foundational concept of reality. Here we see the Hegelian dialectic in its most primal ontological form: from the antithetic struggle of being and not being, new existences become real. Hegel defended this account by allying it explicitly with the Christian doctrine of *creatio ex nihilo* against that of *ex nihilo nihil fit*.[3] By this self-identification, and by the overall tendency of his thought, we can locate Hegel's philosophy as belonging to the development of the modern post-Christian pattern of belief in which humans gradually replaced the biblical God as the creators of reality. In Hegel's contribution to this tradition, humans participate, as appropriate to their cultural stage of development, in the self-creation through history of 'absolute spirit'.[4] Unless one believes that he created the idea on his own, it appears evident that Hegel inherited his idea of ontological 'Becoming' by perpetuating a pattern of thought, received from Christianity, according to which reality is created rather than merely discovered.

2 G.W.F. Hegel, *Science of Logic*, trans. A.V. Miller, Amherst NY, Humanity Books, 1969, p. 82. Emphases in original.

3 Hegel, *Science of Logic*, p. 84.

4 The theme is repeated in the *Science of Logic*: 'Thus consciousness on its onward path from the immediacy with which it began is led back to absolute knowledge…. This is true in still greater measure of absolute spirit which reveals itself as the concrete and final supreme truth of all being, and which at the *end* of the development is known as freely externalising itself, abandoning itself to the shape of an *immediate* being – opening or unfolding itself into the creation of a world…', p. 71. Emphases in original.

However, to acknowledge the indistinguishability of a pure somethingness alone from a pure nothingness alone, one need neither commit oneself to nor reject a creationist ontology. Instead one need only conclude that reality must include patterns, regardless of whether they are created or discovered. One may believe that the perpetuation of the patterns of reality is best explained as in a creationist ontology but the definition does not require us to take that additional step.

In some creation mythologies, reality is seen as beginning from an utter chaos or from an utterly unpatterned stuff, but in such stories there must always be an exogenous source that gives patterns of order to that chaos or stuff. Hence reality begins in these stories not from chaos or stuff alone but from the organizing activity of a pattern-giver. Such a world-maker must either be a knower of eternal realities like the *demiourgos* of Plato's *Timaeus* or it must be the creator *ex nihilo* of those patterns like the God of Christianity. Either way, the created world in such stories can only have become a reality upon receiving those patterns. The reality is the pattern, not the chaotic stuff. If all of reality was made from chaotic stuff, it cannot have already been a reality. Neither can pattern have come from an unpatterned self-creator, because self-creativity is a perpetuating relation between self-creator and self-creation (as described above) that belongs to a pattern. In every case pattern comes first.

Modern science is commonly seen as materialistic in its ontology but this description, if thinly conceived, is misleading. Science is not about unpatterned matter but about the patterns that make up matter; it is about the regularities – that is, the perpetuating patterns – that order the world. The qualities of matter, like mass, are defined by relational equations like Newton's first law. The laws of science, regardless of whether they are more than just Humean regularities, are the perpetuating patterns of nature. In short, science is primarily about pattern and only secondarily, if at all, about matter. If there was a 'big bang' and if its causes are discovered, then science will have found a causal pattern of reality prior to the origin of matter. A science that can search for a reality in which the origin of matter is explained cannot be one that identifies reality with matter. Reality in modern science is not stuff but the patterns that explain stuff.

The question is discussed below as to whether some kinds of reality may exist in the absence of any stuff at all, but this possibility is not required by the definition. Reality at a minimum includes perpetuating patterns of relations; what else it may include is additional to the definition proposed here. A reality must include patterns, whether or not it includes stuff. Without pattern there is no reality. Conversely, an unreality is the absence of pattern or the failure of relations to perpetuate. When an erstwhile reality loses its pattern, it loses its reality even if it leaves stuff behind. That

stuff will remain real only if it is transformed into another pattern of reality, as when a living thing becomes a dead thing, then a rotting thing and then dirt. Each of these states is a reality and if we can discover the causal regularities that link these states, we can relate them into a single dynamic pattern of reality.

The definition is unavoidably incomplete in its enumeration of both the kinds of relations there may be and the ways of perpetuation that may constitute a reality, because the whole of reality cannot be defined here. However, some possible ways of perpetuation are discussed in a section below.

By focusing on the perpetuation of pattern as the minimal defining attribute of reality, the definition allows us to use a common vocabulary to talk about realities that are often thought to be of quite different sorts. To borrow from the jargon of information technology, the definition is designed to be 'platform neutral'. There may be material realities, mental realities and others like mathematical realities that seem exclusively neither material nor mental. Among mental realities, there may be those that are imagined, those that are perceived, those that are remembered, those that are deductively constructed or inductively hypothesized, and so on. Even the merest fantasy or fleeting daydream is real, according to this definition, as long as its patterns last.

If there are perpetuating relations between material and mental realities or among mental, physical, mathematical and other patterns, the definition would allow us to say that these patterns belong, by virtue of those relations, to a common reality or at least to an intersecting or overlapping one. To take as an example the interactive substance dualism of Descartes, we may say that mind and body are not separate realities, or at least are not entirely so, because the perpetuating relations of interaction included in that theory belong to a shared pattern. This commonality need not be complete, however. It may be that there are some mental patterns that are not reducible or fully relatable to bodily patterns, just as there are autonomous bodily patterns (like the beating of one's heart) of which the mind need take no notice. It may be that the overlapping reality between mind and body is incompletable as closed system, perhaps because our knowledge is inadequate or because realities are just irreducibly pluralistic.[5] The overlapping reality may be just one more pattern of relations, or one more reality, in addition to the overlapped realities. It may be that

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5 If 'possible worlds' are real, the definition allows us to say, (1) each is a reality only if there are perpetuating relations within them, and (2) they are separate and plural realities only if there are no relations between them. If (2) does not hold because there are discoverable relations between possible worlds – if for example they occupy different locations in a common spatial and temporal dimensions – then we may instead say that (2') there is a single reality in which these possible worlds co-exist.

nothing is just one thing; perhaps everything is what it is by virtue of the pattern to which it belongs and perhaps those patterns are plural.

Nonetheless, if various realities can be brought into patterns of relation to each other, then among plural realities there would seem to be some that are more comprehensive or inclusive. Perhaps some realities are greater than others. If there is a theoretical limit to the project of unifying reality (as suggested for example by Gödel's incompleteness theorem), then the pluralism of realities only gives us more reason to search for more patterns and for more of the perpetuating relations within and among them. Pluralism is not nihilism – manyness is not nothingness – and the search for more pattern is not contingent on the possibility of its perfection or completion. If patterns are infinitely many, then we may always find more of them and more relations among them.

CLASSICAL ONTOLOGIES

We cannot here discuss every ontological theory but it may be illustrative to survey briefly some familiar examples from Western antiquity. For Anaximander, *to apeiron* was the primitive limitlessness prior to the origin of the elements of the world. To be the source of their reality, however, *to apeiron* would antecedently have had to contain the pattern of oppositions (hot-cold; moist-dry) that defines or delimits them. *To apeiron* therefore either was not completely patternless (which would seem to belie the name) or it was not the source of reality because the patterns of oppositions must have come from elsewhere. The same may be said of water for Thales or air for Anaximenes, each of which alone cannot have been the complete source or basis of reality. As Aristotle pointed out (*Metaphysics*, 984a), something beyond this material must have caused it to change into the things of the world. It fell to others like Anaxagoras to fill the explanatory gap in such systems by proposing *nous* as the rational organizing principle of the cosmos. For the Pythagoreans, the theory that 'all is number' was an early attempt to understand reality in terms of its underlying mathematical patterns, an idea resurrected by Neopythagorean scientists like Kepler in early modernity.[6]

Heraclitus was cryptic but we may to read him to say that while reality includes a flux of change, these changes occur within fixed continua defined by perpetual relations of opposition. Conflict or 'war' is the source of all, yet this conflict occurs within a fixed pattern, which he called *logos*, described by the parameters or poles of opposition. Reality is the regularity discoverable within change: the sun is always new

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6 Charles H. Kahn, *Pythagoras and the Pythagoreans: A Brief History*, Indianapolis and Cambridge, Hackett, 2001.

yet the day is the same. Hence what nature hides from us is its eternal pattern, not its mysterious creativity. Notwithstanding post-Christian interpretations in which he appears as a philosopher of existential newness, Heraclitus in this reading remains a classical eternalist.

Aristotle followed the ancient materialists in attempting to ground the perpetuation of reality in a continuous passive stuff, which he called prime matter, but it played a limited role in his system. In his hylomorphism, the *hyle* holds no meaning without the *morphe*. Just has form has priority over matter in his hylomorphism, actuality has priority over potentiality. (The correspondence of form to actuality and of matter to potentiality is in *Metaphysics* 1048b. The priority of actuality to potentiality is at 1049b.) In Aristotle's teleological ontology, reality is a rational temporal pattern of development from potentiality to actuality as exemplified by the way in which matter takes on form. The priority for Aristotle is always on pattern, not stuff. Aristotle's this-worldly science was a search for the patterns of the world including natural causality, astrodynamics and teleological development, while his logic and the categories sought the patterns of truth.

In the Neoplatonism of Plotinus, the One is somehow the source of the changeless patterns of Intellect; Soul is the temporal animation of those patterns in the world; and matter is ontologically and morally privative because it lacks any pattern of its own. Matter is evil and it is nothing because it lacks the unifying relations of pattern that make things both good and real. However, with Plotinus again arises the unresolved problem of how the patterns of reality can emerge from the patternlessness of the One. It is the perfection of the relation of togetherness or connectedness, but as the perfection of unity, its differentiation into the patterns of the world becomes inexplicable.

Was Plato's ontology about simple essences or complex patterns? Some of the more commonplace examples of the Platonic forms like those of a couch and a table would seem to include an internal structure of relations (*Republic* 596b). Some of the higher ideals like justice and harmony also seem to be relational patterns, such that justice is the ordering and harmonizing of the other virtues within the soul and the city (*Republic* 443d *et passim*). Elsewhere, however, higher forms are described as internally uniform and simple. In the *Symposium* (211b-211e), the iconic Diotima is remembered by Socrates as describing the form of beauty as utterly singular, unified and unalloyed. In the *Republic* (611e-612a), the immortality of the philosophical soul is suggested to be simple and uniform (*monoeides*) like the eternal truths to which it is akin. In the *Phaedrus* (271a), the soul is called one and the same (*hen kai homoion*). In both

works, the simplicity and oneness of the soul is contrasted to the inferior manyness of bodily things.

However, Plato's philosophy also included an ontology of pattern as a dominant theme in the middle and late dialogues. For example in the educational progression of the *Republic* (522-532), the intelligence first learns of number from the relation of distinction implicit in the sorts of perceptions that require a relative comparison, such as hard versus soft or large versus small. From these oppositions we learn of the idea of difference or twoness. But this means we have also learned of twoness (the concept of difference) in distinction to oneness (the concept of sameness). Thus by the application of intelligence to sensation we have discovered the relation of distinction between the numbers one and two. Oneness as such (*auto to hen*) remains the key to the study of true being (524e-525a), but the arithmetic system from the beginning includes the relation of difference or twoness. Next in the educational progression comes geometry, the study of spatial patterns in two and three dimensions; then comes astronomy with its four-dimensional (as we say today) patterns of heavenly motions; then come the more abstract, because unseen, patterns of musical harmony. Finally in the dialectic, the student learns of patterns as such in their full abstraction from any physical instantiation. The highest understanding belongs to the *sunoptikos dialektikos* (537c), a rhyming couplet that refers not to simplicities but to the seeing-together of the complex patterns of reality. The *sun-* and *sum-* prefixes, from which English gets 'syn-' and 'sym-', are often significant in Plato's works (examples appear below). They point to unity not as uniformity but as a relation of togetherness or connectedness.

On this reading, we may see Plato's Form of the Good synoptically not as a simple and homogenous essence but as the connectedness and orderliness that gives a unifying pattern to reality. The Good is the pattern that makes one of the many. Just as justice is the pattern of order that creates a proportioned and harmonious oneness of the other virtues, goodness is the perpetuating order that is the foundation of the patterns of reality. Hence in the *Phaedo* (99c), the Good is described as that which rightly unifies and holds things together (*to agathon kai deon sundein kai sunekhein*), which Socrates awaiting death says he had sought as the cause that orders reality.

In the *Philebus*, the notion of goodness as pattern is again a culminating theme. Oneness is not an utter simplicity; rather, the unity of the one in the many is in the harmonious pattern of order discovered by reason. The patterns of order appear when the definite (*to peras*) is imposed upon the indefinite (*to apeiron*), as for example when the definite patterns of grammar or music appear in the indefinite variability of sound (16c-17c). The one appears in the many as the indefinite becomes patterned by the definite. Its order includes the relations of number, proportion, harmony and

temporal rhythm (17d-e). Thus manyness is not the opposite of oneness; rather, it is the ordered mid-range between the measured unity of definiteness and the measureless infinite (18a-b). Manyness lies between *to peras* and *to apeiron* and appears by the imposition of the former onto the latter, the ordering cause of which is *sophia kai nous* (30c). Bodily health, musical harmony and natural beauty each consist of orderly patterns of moderation and concord produced when the definite imposes number, measure and proportion upon the indefinite (25d-26d). When measure and proportion are lacking, the pattern is not true and cannot perpetuate (64d-e). But when they are joined with truth, the combination is identical with beauty and virtue, and belongs as a unity to the perpetual pattern of the Good (64e-65a).

In the *Sophist*, disease is caused by the disruption of natural relations and deformity by the loss of proportion (228a). The Eleatic visitor argues, against of the Parmenidean notion of oneness as simple uniformity, that otherness or difference is ineliminable in the definition of reality. Anything that has the power to make a difference or to be made different is defined as real (247d-e). The body is related to the world of generation and decay by perception and the mind is related to the world of perpetual reality by rational thought, and these relations of participation or joining are defined as the power to affect or be affected when things combine or meet (248a-b). Hence reality is a system of relations in which different things are connected; it is not a simplex but a complex. However, not all things may be joined. Just as the sciences of grammar and music are those that know which words and notes respectively may be rightfully combined, the dialectical science is that which knows in general the relations of differentiation and association of which reality consists (252e-253e). The dissolution of all relations would be the destruction of all reason because it is only the systematic combination of ideas that makes reason possible (259e).

In the *Statesman*, a creation story is told in which reality is the pattern of order imposed by a god, not upon matter but upon disorder as such. Disorder is the natural state to which the bodily realm in the absence of this imposed order must return (273a-e). In a discussion of due measure at the midpoint of the dialogue, we are told that in the arts, the due measure of practiced judgement by a craftsman is possible only if there exists a true standard of measure in reality (284a-b). To find the due measure of such things as the fitting, the timely and the rightful, we must go outside or beyond the oppositions of mere comparison (284e). Such measures require an understanding of the greater context or pattern in which each action by the craftsman is a part. The science of measurement has to do with all of reality but we must not forget that reality includes similarities and distinctions, including the varieties of measurement (285a-b). Just as the process of weaving begins by straining and

separating matted wool into threads before joining them fittingly into a fabric (280b-281a), statecraft is the weaving of the properly distinguished arts with their respective virtues or excellences into an orderly civic whole (305e-311a). As in the earlier *Republic*, the good city is not that which equalizes and homogenizes the arts and their virtues but that which finds unity in the pattern of relations among them.

Plato did not include matter in his ontology, not even in the *Timaeus* as is sometimes claimed, but he did there discuss the need for a kind of 'receptacle' (49a), 'mother' (50d) or 'nurse' (52d), not as a stuff but as a locus of receptivity (52a-b), which by itself is patternless but which is passively capable of receiving the patterns of the intelligible (51a). The construction of the world is mythologized as the formation of patterns, geometrically rather than from a primal matter or stuff. The *demiourgos* gives order to disorder because the former is always better (30a). He does so by imposing proportion, the most beautiful of the bonding relations, on the four elements and thereby brings the sensible world into existence as a patterned unity (31b-32c). The elements themselves are not made of stuff but are constructed geometrically with form and number (53b). Hence the universe was not brought forth as a stuff or substance but was organized as a pattern, before which it was without rational order and measure (*alogos kai ametros*, 53a).The soul of the world is also constructed as a mathematical proportion combining the ideas of sameness, otherness and existence (35b-36b). It is because the soul is a proportionate pattern that it can participate in reason and harmony (36e-37a). In the *Timaeus*, physical reality is a pattern of relations without any stuff.

In the *Laws*, the greatest harmony is the greatest wisdom (689d) and the task of the lawgiver is to protect against disorder using his knowledge of the proper measures of reality (691a-d). The Athenian describes the proportion and harmony found in the patterns of natural motion in order to demonstrate the primacy of rational lawfulness in the universe (893b-894a). The most rational pattern of movement is uniform rotation around a fixed center and absolute irrationality is exemplified by motions that are variable, uncentered, unsystematic and disorderly (898a-c). The educational progression of the *Republic* is rehearsed (817e-818d) with its highest stage described as the ability to order together everything that can be comprehensively seen (*suntaxasthai panta sunoronta*, 965b) and the highest task of which is to give a rational harmony, akin to that which rules the stars, to human customs, institutions and laws (967e).

Each of these late works is exploratory and none can be taken as containing Plato's finalized ontology because his works do not give us one. But each exploration, including his (perhaps earlier) theory of the Forms, is a search for the patterns of reality apart from its material. What the later dialogues may represent is a move away

from an earlier openness to the ideal of Parmenidean simplicity toward the idea that reality at its most basic is a complex pattern in which relations of distinction are ineliminable. Plato's philosophical method was to search open-endedly for reality, which may suggest that for him perfect knowledge of its patterns remains beyond human abilities. Nonetheless, without the possibility of pattern, reality has no meaning. Moreover, it seems demonstrable that some patterns of understanding are more enduring than others when tested by reasoned argument. If the search for better patterns of understanding is to be possible, then the idea of perfected knowledge, if only as an asymptotic or regulative ideal, must be theoretically possible even if humanly unattainable.

What significantly distinguished the pre-Socratics from the Athenian triumvirate of Socrates, Plato and Aristotle was the latter's desire not just to find but to test the perpetuation of the patterns of reality. The centrally important deconstructive task of philosophy began as far as we know with the eristic tradition that arose with the Sophists and with Socrates. The Socratic dialectic is a critical method of ending the perpetuation of false patterns; Socratic reason is less often a glue that a solvent. Its task was to dissolve the many false patterns of belief so that the eternal truths within the soul could be recalled. In Platonic dialogues like the *Sophist* and the *Parmenides*, the excesses of eristics were criticized and were moderated but Plato never abandoned the method of elenchic dialogue; even in the *Laws*, it reappears in key passages interspersed among long monologues. Aristotle's commentaries tell us of the earlier philosophers not to commemorate but to criticize them. Aristotle's logic showed how ideas could be extended and explored but also it played the deconstructive role of excluding from truth those patterns that do not hold.

If anything is ever real and true, then the task of finding it requires methods of clearing away those patterns of thought which, when critically examined, do not hold together or that hold things together falsely. There are many ways to relate things in our thoughts but there are many ways of thinking which upon critical examination do not persist. For example, the fact that we can easily yet fleetingly imagine a winged unicorn but that we cannot perceive one enduringly, and that we can easily and enduringly perceive an ordinary horse when one is present, suggests that some realities perpetuate more readily than others do. Merely imagined realities are those that cease to perpetuate when criticized using standards that belong to more stable patterns like those of reason and careful observation. The task of philosophy since the classical period has been to search for the perpetuating patterns of reality by finding the relations that hold as more than mere creations of the imagination. The task is in part deconstructive but it cannot be totalistically so because the tools of criticism are

based on perpetuating relations such as those of logic. Deconstruction is impossible if its tools turn out not to be real.

PERPETUATION

The familiar notion of temporal persistence is one possible mode of the perpetuation of patterns, as is the repetition of patterns in different locations in space and time. Motion is the dynamic pattern of changes of spatial location across time. In modernity, these relations were mathematized by such discoveries as Descartes' coordinate system, his analytical geometry and the calculus of Newton and Leibniz. The mathematical mapping of the physical world across time allowed the ancient view of motion as the destruction of a perpetuating reality to be replaced by the discovery of previously unseen regularities. What modernity learned from the likes of Descartes and Newton was that observable earthly motions, and not just those of the heavens as the ancients had thought, display the regularity of pattern. Newton's laws were later shown to be limited to a given inertial frame but this meant only that a more complex pattern of physics had been discovered in the variable compression of the dimensions of time and space. The scientific discovery of the patterns of nature is ongoing and exceptions such as quantum randomness may exist but so far these have not been sufficient to reduce reality to chaos. Indeed, the probability functions of subatomic physics are another kind of mathematical pattern. In the statistical aggregate, randomness produces probabilistic patterns rather than chaos. If God plays dice, the game yet has mathematical rules. In our current state of knowledge, nature seems to consist uniformly of mathematical patterns of relations.

However, the definition of reality as pattern does not require us to reduce every reality to those of today's physical sciences. For example, the definition leaves room for various understandings of time and space. If time is understood not as a dimension of spacetime but as a process from which new patterns emerge, those patterns may be said to become real only if and when they begin to perpetuate. In cyclical theories of time, the pattern of things repeats; in linear theories, it does not; in teleological theories, it is completed. If time and space are mental constructions of the Kantian sort, they are real as the necessary condition for our perception of the perpetuating patterns of temporal and spatial things. If time and space instead are merely cultural inventions and if reality is a social construction in a strong ontological sense, the patterns of such a reality must perpetuate once constructed; if not, the construction of a reality has failed. If reality is created, it continues to be real only if it perpetuates in some way.

The definition also allows for the possibility of realities that are independent of time and space. For example, mathematical patterns and those of formal logic may be

described as timeless and spaceless. In the ancient view, such relations are eternal, which may mean either that they perpetuate for the entirety of time or that they perpetuate in a way that is entirely independent of time. Platonic forms, if there are such things, are non-temporal and non-spatial. Scientific laws describe the patterns of things in time and space but the laws themselves are not physical things that exist in time and space. Perhaps the laws of nature are eternal but if even if they were created by a higher cause or emerged from a founding event, they perpetuate in a way that does not seem temporal or spatial like the things they describe. If such laws define time and space, it is difficult to imagine them as existing in time and space.

If the existence of eternal realities is impossible for temporal beings like us to prove, it is also impossible for us to prove their non-existence. Whether or not there are eternal realities, either omnitemporally (throughout all time) or extratemporally (independently of time), the question cannot be settled by definitional fiat so it is left open here.

Also left open is an enumeration of the meanings of perpetuation. The notion is intended to be pluralistic for the sake of definitional inclusivity, but if its meanings are various they need not be contradictory. The pluralism of the word allows us to say that the patterns of reality are those that persist or repeat or grow or reproduce or are algorithmically generative or are causal or are creative or ... are able in some way or other to perpetuate. It may be that there are modes or ways of perpetuation that operate in combination with other modes or ways. There may be modes that act against other modes, as in the notion of creative destruction in which the persistence of an old pattern is destroyed by the generation of a new one. However, the possibility of destructive or mutually competitive modes of perpetuation does not mean that the notion of perpetuation is self-destructively ambiguous in its very meaning. Instead it is open and limited only by the ways is which patterns may be real.

Perpetuation need not be everlasting for a given pattern to be named as real. An ephemeral pattern in time and space, like a lightning bolt, is real as long as it lasts. Fleeting patterns are real to the degree or extent that they achieve some kind or degree of perpetuation. When an impermanent reality like a lightning bolt or a living body goes out of existence, it is not its stuff but its pattern that has failed to perpetuate. Electrical energy is dispersed into other patterns as the lightening bolt ends its reality. A rock that crumbles into soil or a dead body that rots into dust leaves behind a mass of stuff but the rock or the body is no longer real because its particular pattern has ceased to exist. Even for a material thing, its reality is its pattern and not (or not just) its matter. When a particular pattern has failed to perpetuate, a particular reality has gone out of existence.

Within the context of a broader reality, perpetuation can also describe the process of destruction of a pattern or the ongoing unreality of a pattern. For example, in our time it is a reality that dinosaurs are no longer real. The process by which the dinosaurs perished was a dynamic or temporal pattern that was real while it occurred. A perpetuating process of destruction or pattern collapse can lead to state in which an erstwhile pattern no longer exists. The biological and behavioural patterns called 'dinosaurs' failed to perpetuate in evolutionary history, but this is only to say that in the broader context of that history, the perpetuating reality of the process of evolution includes the end of the reality of the dinosaurs. Pattern-collapse or destruction, which is a failure of perpetuation, may be real in the context of a broader sequential or temporal pattern that is real. Hence the failure to perpetuate of a particular ephemeral pattern like a dinosaur is part of the perpetuating reality of evolutionary history.

But the utter failure of all patterns to perpetuate would mean the end of reality altogether. If all of reality collapsed into patternless chaos, the latter might perpetuate but not as pattern and therefore not as reality. The perpetuation of total nothingness is still total nothingness. There can be perpetuating realities within which particular patterns collapse or are destroyed, but if all patterns were to collapse universally and forever after, reality will perpetually have come to an end. Perpetuation is not the sole criterion of reality; it must be the perpetuation of a pattern.

Some modes of perpetuation may involve temporality but not spatiality, as in speech and music. Aural patterns may perpetuate by persisting for a time like single note, or they may repeat like the chorus in a melody, or they may perpetuate by a kind of extrapolation or growth as with variations on a musical theme. Musical improvisations do not appear from nowhere but are developed by building upon an initial pattern. An improvisation like those of John Coltrane begins by borrowing or establishing a recognizable melodic pattern and then grows, sometimes surprisingly but never arbitrarily, into a melodically related pattern.[7] Such modes of artistic perpetuation may be understood as a kind of creation *ex nihilo*, as the bringing into being of an existentially new pattern, but an alternative view is to see successful artists

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7 'Motives and thematic ideas reappear at several points during a typical Coltrane piece, but not necessarily in a methodical manner. These serve as reminiscences that lend coherence to the melodic content of the solo. Usually the more structurally important connections are not these simple reminiscences but the progression from one motivic idea to the next…. Listening to Coltrane's recorded performances, we hear a composer at work, shaping, developing, and connecting musical ideas while attempting, often successfully, to keep the musical whole in perspective'. Lewis Porter, 'John Coltrane's "A Love Supreme": Jazz Improvisation as Composition', *Journal of the American Musicological Society*, vol. 38, no. 3, 1985, pp. 620-21.

as the discoverers of the possibilities and limits of reality. Radical explorers like John Cage may attempt to remake music by breaking its patterns but they too begin from that which they seek to deconstruct. By departing from familiarity they cause us to search in our hearing for new patterns of meaning. The experience can be enlivening but it too is describable as a finding rather than as a creating.

Perpetuation may also occur spatially without changes of time, as when similar geometrical forms are repeated in different locations within a given spatial frame, for example in a photograph of a child blowing bubbles. However, the experience of seeing spatial patterns, even if no motion occurs, does involve temporality because sensory experience is inherently temporal. To be real, an experience must persist for a time; if it recurs in time, its reality is confirmed and reinforced.[8] In simple events of perception it is the patterns that persist and recur that we call real; a misperception by contrast is one that does not persist or recur as first imagined. A fevered imagination can produce vivid images but they disappear with the fever. A dream may be distinguished from wakefulness by the greater ephemerality of the patterns of the former. The experience of dreaming is real but only as long as its patterns persist, as are the patterns we merely imagine or remember.[9] Various kinds of experiences including perceptions, imaginings, memories and dreams are defined here as real but they are variably real and are differentiable by their reliability or success in perpetuation. An accurate perception perpetuates more successfully, especially when tested by reason and experimentation, than a misperception or a mere imagining. The critical tests of reality in perception, like those in philosophy and science, are tests of the perpetuation of patterns. Some perceptions lead to insight and understanding,

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8 This suggests an answer to a problem in Humean empiricism about how habituation allows us to find a pattern on repeated observation though we cannot do so from an initial observation. How can a thought pattern repeat if it does not appear in the first instance? If mental events are understood always as perpetuating for an extended moment, then we may say that persistence is required for a pattern to form and recurrence is required both to confirm and to reinforce it. Persistence sets; recurrence cures. Persistence and recurrence are the modes of perpetuation that must be present for thought patterns to become real. Humean habituation is the temporal perpetuation, minimally including persistence and recurrence, of a pattern of experience such that it becomes a mental reality.

9 The example of memory is illustrative of the role of pattern in thinking. We are able to remember individual items more easily when we can fit them into patterns, even if the latter are entire fabrications as with mnemonic techniques like the 'memory palace'. By constructing a fictional pattern of relations among items, we remember them much more easily because memories, like all thoughts, consist of patterns of relations. That is why proper nouns like peoples' names, which are semantically arbitrary, are more difficult to remember than common nouns, which take their meaning from Quinean 'webs' of ideas. A thought is a web or a pattern of relations and not just group of separate ideational items. The mind is never just a Humean 'heap' but is always a structure of relations through which meanings take *form*. The mind is *informed* by patterns of reality.

which is to say that they belong to a greater pattern of meaning. They perpetuate not just by persisting and recurring but by also by growing and connecting.

We do not experience the physical world directly; instead we experience relatively stable patterns of perception. The abductive hypothesis that most of us form to explain this stability is that our perceptions are caused by an independently existing physical world, though Berkeley for example offered a competing hypothesis. We learn of that stability by comparing it to the greater ephemerality of misperceptions and mere imaginings. Some experiential patterns perpetuate more successfully than others, even when tested by reasoned observation. The patterns of perception that perpetuate most robustly against such tests are those that, open-enddedly and fallibilistically, we may call empirical truths. Those that perpetuate by growing into and joining with greater patterns of meaning are those that are importantly true.

Patterns may grow from seeds of various sorts, like those of plants or crystals. Patterns like DNA are algorithmic codes that allow subsequent patterns to grow in time and space. Such algorithms are growth-determining patterns that allow further patterns to perpetuate physically, but their own reality is not physical. They are purely formal or, in an active sense of the word, informational: they are patterns that form other patterns. Algorithmic patterns like DNA or a recipe book contain the possibilities of patterns that will appear if the right conditions are present and if the encoded instructions are followed. Algorithmic generativity is the perpetuation of one kind of pattern by a different kind of pattern given the right pattern of conditions.

Communication is the perpetuation of a pattern of experience or mental activity from one mind to another. It too is informational in the active sense of the word. Its processes are often imperfect but the degree to which communication succeeds is the degree to which a mental pattern has been perpetuated from one mind to another. To communicate is to participate in shared patterns of thinking and feeling. The fact that most of our patterns of thinking are not original to us individually but come from others is good evidence against solipsism. Language is among our most important realities because it allows us to share patterns of experience. To communicate is to participate in a shared reality. The test of communicative success turns on whether a reality has been perpetuated between persons.

To tell a story is to relate things into a narrative pattern. Metaphorical thinking is the propensity to see one thing on the pattern of another. A good metaphor, like a good story, is one that helps us see that things fit together in a way we had not previously experienced. However, the experience of newness may be more usefully called a discovery than a creation. A metaphor works by allowing us to use a familiar pattern of understanding, formed in one context, to experience another context in a

new way. The experience of newness is not a creation out of nothingness but the discovery of a reality that we had not noticed before. An artist is not an existential god; rather he or she is someone who finds meanings that others have not yet discovered. The artist is someone who discovers new possibilities of experience, yet the criterion of artistic meaning is not newness but pattern.

Sometimes our metaphors are forgotten. The belief that humans are creators is modern and largely Western; it seems likely to have been inherited from the existential creationism of the Bible. Humans are habitual thinkers who become enculturated into patterns of understanding. Among the oldest habituations in the West is the metaphor of humans as the image and likeness of God. Creativity is a copied idea; no one today created it. As modern Westerners, we have been enculturated into seeing ourselves as creators on the pattern of the God of Genesis. The alternative is to see ourselves as discoverers of the patterns of reality in all their variety and to see newness as belonging to the richness of what we have yet to learn.

WHAT STUFF?

Can the substance of reality be pattern without stuff?[10] The definition is silent on the question of whether stuff is necessary, though it is not neutral on the relative importance of patterns versus stuff. The definition directs our ontological focus away from stuff toward the patterns without which, even for materialists, stuff has no meaning. For a materialist like Hobbes, for example, reality is not matter alone; instead reality is the mechanistic patterns of matter in time and space. In ontologies that include non-material stuffs, pattern is also requisite. In Hegel's idealism, reality is not undifferentiated thought-stuff; it is the emergent pattern of ideas in history. The dualism of Descartes is commonly seen as including two kinds of stuff, *res cogitans* and *res extensa*, ideational stuff and material stuff, which respectively are patterned as two kinds of reality.

As noted briefly above, in Cartesian interactive substance dualism, the two kinds of stuff are related by their interactions. The definition of reality as pattern allows us to say to Cartesian dualists that mind and body, by virtue of their relations of interaction, belong to a single overlapping reality. The pattern of a tree as a physical arrangement of molecules and the pattern of a tree as it is experienced in perception may be of different alleged stuffs but this need not cause us to say that they are separate realities. By focusing on pattern rather than stuff, we may say that the physical tree and the experiential tree belong to the same reality by virtue of

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10 'Substance' here means that which 'stands under' as ontologically basic. Only in materialism does substance mean matter.

perpetuating relations between them. Hence the definition gives us a conceptual bridge across the Cartesian divide. The definition does not tell us what those relations are or how they perpetuate but it does direct our attention to a meaningful sense in which there is a shared reality in which minds and bodies exist together. The alternative focus on stuff as the basis of reality diverts us from the possibility of such a reality and deepens that divide.

Similarly, the focus on pattern rather than stuff gives us a vocabulary with which we may say that communication between minds is the sharing of a common reality, whereas the idea of minds as individuated thought-stuff exaggerates the separateness of minds. If, as in Hume's metaphor, the mind is not the theatre but the play, then communication is the means by which we join the performance.[11]

But is it possible to imagine an ontology of pattern in the absence of any basic stuff? Can relations be ontologically elementary or foundational? It does seem that for some realities, no obvious kind of stuff is required. It is a reality that one plus one equals two. Mathematical truths of this sort describe perpetual relations without stuff. It would be odd to insist that mathematical patterns are real only when they are instantiated in some kind of substance such as those of physicality or ideation – that one plus one equals two in reality only when two physical things are actually present or when a mind has the knowledge that one plus one equals two. Mathematical patterns are real independently of physical or mental instantiation. It would also seem odd to insist that mathematical patterns must consist of some other special kind of mathematical stuff. Mathematical realities are patterns without stuff.

The meanings of 'one' and 'two' are given by the relations of each to the other and to the broader pattern of mathematics in general. Perhaps the overall pattern of mathematics should per Gödel be described as an open Quinean web of meanings rather than as a closed analytical system. Quine's objection to analyticity reinforces the point that things take their meaning from their relations within a greater pattern.[12]

Is it possible that the physical world consists of pattern more fundamentally than it consists of stuff? As mathematical thinker, Descartes, perhaps with a cue from Plato, defined the physical world geometrically as *res extensa*, which is a pattern of spatial

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11 David Hume, *Treatise of Human Nature*, Oxford, Clarendon Press, 1739-40, bk. 1, pt. 4, sec. 6.

12 W.V.O. Quine, 'Two Dogmas of Empiricism', *From a Logical Point of View,* 2nd ed. Cambridge MA, Harvard University Press, 1961. Quine's objection was not to the relational nature of definitions belonging to analyticity but to the supposed closedness of its patterns. If the patterns that produce meanings are broader and more open than analyticity allows, then meanings may change if the broader pattern or 'fabric' of belief changes, precisely because meanings are relational.

relations.[13] Our clear and distinct ideas about physicality are only those of shape, size and motion, each of which has to do with pattern rather than stuff.[14] The slogan attributed to Kepler, '*ubi materia, ibi geometria*', says where there is matter, there is geometry. According to Galileo, mathematics is the language and geometrical figures are the alphabet in which the book of the universe is written.[15] That such sayings are well known shows that the primacy of pattern in physics is not only a thinkable but a familiar notion among today's scientific commentators.

In modern physics, matter is not an operational term. Terms like mass and energy are defined in mathematical equations by their relation to other such terms, including each other as in Einstein's most famous equation. Energy and mass have meaning, scientifically and more colloquially, by virtue of the patterns to which they belong. This need not mean that their reality is relativistic and reducible to arbitrary human-made definitions; instead we may say that their meanings are real because they belong to patterns that have been tested and that, given our current levels of understanding, seem to be real. Energy and mass are real, as best we can tell, because they appear to belong to a pattern of reality that has held together.

Planck's constant tells us that energy comes in minimal quanta, such that the physical universe is sometimes said to be 'grainy' at the finest level. This suggests that physical existence may be digital at its most basic level. It is a pattern of binary digits or 'bits' of existence, bits defined by the relation of contradistinction between something and nothing, mathematically given as one and zero. If physical reality is digital rather than continuous at the finest scale, then it may be that the physical world at the most basic level is pattern, not stuff, because binary digits or bits are pure patterns without stuff. They are mathematical patterns in which the parts, one and zero, are entirely defined by the relation of distinction between them. A bit is not the relation between two kinds of stuff but two kinds of states, something and nothing, which are defined purely by the difference between them. Neither alone is meaningful. In a binary digit, the relation of distinction does all the existential work. No material is needed. If physical reality is 'grainy' in that sense at the most basic level, then its substance is pattern without stuff.

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13 Plato had already described the physical world in terms of length, breadth, depth, as well as force or strength, and had also described these in contradistinction to mind or soul (*Laws*, 896d).

14 Descartes seemed ambivalent as to whether there can be extension without stuff. On one hand, matter is nothing but extension because everything else can be stripped from it (*Principles of Philosophy*, II.iv, II.xi); on the other, a vacuum cannot exist because there can be no extension unless a substance is extended (II.vxiii).

15 Galileo Galilei, *The Assayer*, in *Discoveries and Opinions of Galileo*, trans. Stillman Drake, New York, Doubleday, 1957, pp. 237-38.

Alternatively, perhaps the physical world at the finest grainy level nonetheless consists of energy, which is the foundational stuff of physical reality. Perhaps physical reality requires not just a binary relation of distinction as such but the specific relation of distinction between a minimal quantum of energy and a quantumless nothingness. If so, it remains evident that physical reality at the finest level is not just unpatterned energy but a grainy pattern of energy. Matter is pattern, even if it is a pattern of stuff. Physical reality may be a pattern of stuff or it may be pattern alone, but it is not stuff alone.

Some physicists today think that particles are 'compactifications' of multi-dimensional geometrical 'strings' or 'branes' (from membranes) and that spacetime is not the given framework within which they interact but is a phenomenon that emerges from the patterns of their interactions. Such theories are works in progress but they accord with the suggestion above that space and time or spacetime, if it is to be described as a reality, cannot be that within which reality happens. In the geometric foundationalism of these theories, the basis of reality is the geometry of relations by which spacetime and everything else is able perpetuate (a view that in one such account began with the Pythagoreans and was developed in Plato's *Timaeus*).[16]

To conclude, where there is a reality, there is a pattern; where there is no pattern, there is no reality. The meaning of reality is in its perpetuating patterns and not its perpetuating stuff. Perhaps some realities consist of patterns of stuff but in any reality, its pattern is its essence and foundation.

Department of Political Science
University of Northern British Columbia
3333 University Way
Prince George, BC, Canada V2N4Z9
+12509605662
dewielb@unbc.ca

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16 'In addition to realizing that mathematics was the key to fathoming our universe, he introduced an approach we now call the geometrization of physics—the same leap that Einstein made. In an act of great prescience, Plato suggested that the elements of nature, their qualities, and the forces that act upon them may all be the result of some hidden geometrical structure that conducts its business behind the scenes'. Shing-Tung Yau and Steve Nadis, *The Shape of Inner Space: String Theory and the Geometry of the Universe's Hidden Dimensions*, New York, Basic Books, 2010, xix. Reference to Pythagoreans, pp. 21-22.

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