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An Analysis of Properties in John Heil's *From an Ontological Point of View*

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Abstract

In this paper I argue that the requirement for the qualitative is theory-dependent, determined by the fundamental assumptions built into the ontology. John Heil's qualitative, in its role as individuator of objects and powers, is required only by a theory that posits a world of distinct objects or powers. Does Heil's 'deep' view of the world, such that there is only one powerful object (e.g. a field containing modes or properties which we perceive as manifest everyday objects) require the qualitative as individuator of objects and powers? The answer depends on whether it is possible to account for the manifest objects and the ostensible spatial primacy of our perceived world without recourse to the qualitative. In this paper I outline just such an account with the intention of extending Heil's efforts to incorporate fundamental power in the world while providing a coherent explanation for our strong intuition of spatial, as against relational, priority.

John Heil's book, 'From an Ontological Point of View' (2003) is a tour de force in its contribution to analytic metaphysics in general, and to the philosophy of properties specifically. Heil defends a substance ontology of the world. His starting point is a world of objects that are basic entities, whose properties are 'modes' or *ways* that these objects are. Complex objects are constitutions of objects which are constitutions of objects and so on. Given that it is an empirical issue, Heil is largely noncommittal about the existence of some simple, indivisible object, although he maintains that it is hard to imagine it not existing.

Heil correctly highlights the tension between the needs to account for the world in terms of both qualitativity and power or dispositionality. We have an overwhelming sense of the world being spatially-oriented, and this seems to derive from the properties of objects such as shape, size, solidity and so forth, commonly thought of as their qualities. Yet, without the power or ability of things to affect us in the ways they do, we would not experience this ostensible spatial primacy.

A central focus of Heil's ontology, therefore, is to claim that the properties of objects must be both powerful and qualitative. There can be no size or shape to objects unless they possess intrinsic and non-relational properties to *individuate* them from their surrounds. Yet such properties are detectable and the ability to *be detected* is a power. Heil's response is to defend a strict identity between an object's qualities and its dispositions or powers.

1 Heil's Identity Theory of Properties

Heil uses the term 'qualitative' to specify intrinsic, non-relational properties of objects. He adopts John Locke's account of *qualities*, which he regards as both qualitative and powerful. Locke writes:

> Whatever the Mind perceives in it self or is the immediate object of Perception, Thought, or Understanding, that I call *Idea*; and the Power to produce any *Idea* in our mind I call *Quality* of the Subject in which the power is. Thus a Snow-ball having the power to produce in us the *Ideas* of *White*, *Cold* and *Round*, the Powers to produce those Ideas in us as they are in the snow-ball I call *Qualities*.

Locke famously distinguishes between primary and secondary properties: Primary properties are those revealed to us *as they are in their objects,* e.g. shape; whereas secondary properties (Locke's 'pure powers') are those that cause perception of certain properties that are not intrinsic to the object, e.g. colour. For Heil, however, all Locke's qualities are power-bestowing, and therefore the distinction between primary and secondary qualities should not be carried over to create a corresponding distinction between qualitative and dispositional properties. Hence, Heil collapses what some have considered higher-level properties to just a single level such that every property of a concrete spatio-temporal object is 'simultaneously qualitative and dispositional' [1]

For Heil, power or dispositionality[2] is built into the universe and a property's dispositionality is strictly identical with its qualitativity, and both are strictly identical with the property itself (p. 111). The formulation is set out as follows:

If P is an intrinsic property of a concrete object, P is simultaneously dispositional and qualitative; P's dispositionality and qualitativity are not aspects of properties of P; P's dispositionality, P_d, is P's qualitativity, P_q, and each of these is P: $P_d = P_q = P$.

The strict identity requires a denial that either the purely qualitative or the purely dispositional exists. Rather, these must be regarded as unrealizable limits of different ways of being that property. Neither is it the case that properties *combine* dispositional and qualitative aspects, nor can the two be somehow prised apart. This leads to the stance that it is not possible to vary dispositionality without varying qualitativity and vice versa (p. 115).

2 Why the dispositional is not reducible to the qualitative

Of the reasons that Heil outlines for denying that dispositions supervene upon a purely-qualitative base, three stand out: First, purely qualitative properties would not be detectable, and so we would never know of their existence; second, higher-level dispositions lack a causal role; and third, strong causality requires irreducible dispositionality to be built into things.

1 Pure-qualities are not detectable

If there were pure qualitative properties, we could certainly know nothing about them. This claim takes us back to Locke's *qualities* whereby detection requires the ability to be detected—which is itself a power. We can never experience pure-qualities. Our experience extends only to qualities that are powerful. Why postulate entities that we can know nothing about?

2 Higher-level dispositions lack a causal role

Attempting to supervene dispositions on a purely categorical or qualitative ground encounters the problem of over-determining the role of dispositions. If, as Prior, Pargetter and Jackson claim , the categorical base is the 'real' causal agent for an object's possession of power, then it seems that qualitative properties are causally and irreducibly powerful, so any distinct higher-level dispositions are causally impotent. If the microstructure plays the causal role, there is no need to postulate dispositions over and above the microstructural base. This leaves a microstructure that is both qualitative and powerful.

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1   The term 'higher-level' is described by Heil to mean 'a property possessed by an object in virtue of that object's possession of some distinct, lower-level realizing property'.

2   Heil sometimes uses these terms interchangeably.

3 Strong causality requires irreducible dispositionality to be built into things

Rather than being built into qualities themselves, power might be provided by contingent laws of nature. This view would be consistent with the categoricalism of David Armstrong. But accounts that rely on contingent laws of nature fail to provide a satisfactory explanation for necessity in the world.

Armstrong attempts to account for necessity by proposing a system of universals (or repeatables) and contingent laws that link (or forward-link) these universals in repeatable patterns: *the same relations between the same universal instances*. However, Charlie Martin and others have shown that this 'connecting' or 'forward linking' relies on some 'connectability' in the properties themselves. Thus irreducible dispositionality is built-in to properties, rendering them power-qualities after all. If irreducible dispositionality is not built-in, then it must come from the laws. Herbert Hochberg and Alexander Bird have shown that Armstrong's proposal, for strata of higher-order laws to accommodate such an explanation, ultimately fails.

3   Why the qualitative is not reducible to the dispositonal

In this section I discuss three main points that Heil makes against the existence of purely non-qualitative worlds: First, relations need relata; second, such worlds leave no room for the counterfactual nature of dispositions; and third, we cannot distinguish empty space from space with non-qualitative objects.

1 Relations need relata

Heil discusses world-models put forward by Richard Holton and Randall Dipert in which we have networks of relations without relata other than perhaps dense nodal points that are intersections of relations. Heil asserts that relations need relata, and denies that these relata can be merely dense nodal intersections that are characterised entirely in terms of their relations to other such nodes (pp. 99, 103). One reason why relata must be independent of their relations is to avoid a situation of interdependence: If relations did not exist except between relata that are only dense nodes of intersecting relations, then we readily end up with neither relations nor relata (p. 104).

As I see it, however, this problem occurs only for a world that has no relations in the first place. In a proposed purely relational world, relations are fundamental. They *do exist*, and therefore intersections among them also *do exist*.

2 The counterfactual nature of dispositions

Heil discusses a second problem: Dispositional ascriptions are fundamentally modal but worlds composed of pure power must suppose necessary relations, and thus cannot account for a sense of possibility or the counterfactual nature of dispositions. A tumbler possesses the disposition of brittleness, because it will shatter when dropped in suitable circumstances, but this incorporates possibilities that need not be fulfilled. A purely relational world has no room for modal truths, since it is composed of relations that are already *actual*. Put another way, if objects are *nothing but their relations* (or dense nodal intersections of relations), then the existence of an object ensures that the relations comprising it already exist. We get a static universe rather than one open to possibilities, making it difficult for objects to possess dispositions in the first place.

In reply, the fact that a purely relational world is a static world does not remove the aspect of possibility. It can be argued that the counterfactual employment of dispositionality is epistemological, whereas fundamental power or potential is ontological. Taking a 4-dimensional block universe (4-D) view, we can provide for 'possibility' even though, as in a purely relational universe, the view is static. In such a universe, the intersections of object world-lines represent interaction. At any given time slice, the possibility of two world-lines intersecting is defined by the conjunction of their respective 'future light cones'. The extent to which light cones overlap pertains

to the distribution of mass-energy associated with power or potentiality. However, the notion of 'possibility' embedded within our use of counterfactuals is pertinent because we are blind to the future. We do not possess a 'God's-eye point of view' to know 'the end from the beginning' (see: Isaiah 46:10). Observing whether any two world-lines actually intersect, God has no use for possibilities.

In a 4-D view, 'possibility' arises due to the inability to see time slices 'ahead'. In a purely relational universe, 'possibility' arises similarly, due to the inability to see beyond a certain radius within the relational net. In either case, possibility is merely an epistemological abstraction, and need not enter into ontological considerations.

3   Cannot distinguish empty space from space with non-qualitative objects

The third problem Heil raises for non-qualitative worlds is derived from an argument supplied by David Armstrong.[3] Heil argues that properties such as shape, size, position, duration, divisibility, solidity and so on cannot, of themselves, give us a physical object because these properties could just as easily apply to any region of space (p. 106). Even motion can be treated as a body 'occupying' adjacent spatial regions over successive intervals, and solidity as applying to one region of space being impenetrable to another. He concludes that something additional is required for distinguishing the presence of these properties from 'empty space'. This something is that which allows us to sense—to see, hear, smell, touch and taste—the objects of the world. Lacking this additional ingredient, we are left 'without a coherent conception of material bodies' (p. 107), since a non-qualitative world would supply insufficient conceptual resources (p. 100) to differentiate between space which is empty and space occupied by material objects. 'If an object's qualities are reduced to or replaced by pure powers,' writes Heil, 'anything resembling substantial nature fades away. Substances wholly bereft of qualities are difficult to envision' (p. 99). A non-qualitative world is, to all our sensibilities, 'empty of concrete objects' (pp. 76, 102).

In such a world, then, could objects be merely conglomerations of spatial points rather than substantial points? Drawing on an argument analogous (p. 98) to Richard Swinburne's regress critique of Sydney Shoemaker's Causal Theory of Properties, Heil says no. The world that lets us *experience* individuated objects as having shape, size, motion, solidity and so on incorporates either material objects or some 'field' of 'granular substance'. This argument relies on the premise that even if properties like shape, position, duration, divisibility and solidity, *of themselves*, could be accounted for dispositionally, then the qualitative would still be required with respect to how these properties are *detected*.

A related argument is that in a world of pure powers, qualities are needed in order to differentiate powers. Otherwise we lack an explanation for how objects are distinguishable from one another; for a world of pure power does not, of itself, provide for objects to be individuated *as* objects. Accordingly, the qualitative is required for the individuation of powers such that object-hood is possible. This idea is reflected in Heil's words, 'qualities inescapably enter into the individuation of powers, and in a way that makes it hard to see how these could vary independently' (personal communication, 2007, August 8). Martin expresses a similar thought in his view that, 'The qualities of shape and size are intrinsic and provide the form and extent of the "shell" of the entities that have them'.

In response to these objections to non-qualitative worlds, I note that Swinburne's regress is an appropriate critique, that the qualitative may be required to individuate objects in a world containing multiple distinct objects. However, altogether, it seems that a requirement for the qualitative holds only for ontologies that assume distinct objects. The arguments against purely relational worlds, as discussed above, seem to rely on assumptions neither necessarily shared, nor required, by non-qualitative world-theorists, namely: i) that relata need to be distinct from their relations and therefore qualitative; and ii) that we need an ontologically-robust account of

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3   Heil is careful to make clear that this is no longer Armstrong's view.

possibility.

The task facing a non-qualitative theorist, though, is to account for our manifest individuated things. Heil poses a good question: If there are no qualities, what plays the substance role? I will return to this question shortly, but first I outline a tension in Heil's strict identity of the qualitative and the dispositional, namely, whether his power-qualities are truly singular or dual-natured. In what follows, I argue that they *are* singular, but fail to provide a satisfying explanation for what it means to be powerful. I go on to argue that Heil's 'deep' Spinozian view—of a world that contains only a single object whose modes or properties are the manifest objects of everyday life—does not encounter this explanatory lacuna.

4 The qualitative and dispositional – a mere epistemological differentiation?

The denial of pure qualitativity leads Heil to deny that dispositions can be reduced to the qualitative. And the requirement for something more than pure relations or power to individuate objects leads him to deny that the qualitative can be reduced to the dispositional. As mentioned earlier, his proposed solution is to collapse the dispositional and the qualitative as a strict identity. But this leads to considerable tension in his characterisation of properties, as evidenced in the passage below:

A property's dispositionality and qualitativity must be thought of as unrealizable limits of different ways of being that property. Because dispositionality and qualitativity are equally basic and irreducible, there is no asymmetry here. A property's qualitativity, for instance, does not "ground" or serve as a supervenience base for its dispositionality. A property just is a certain dispositionality that just is a certain qualitativity.

If the dispositional and qualitative are *irreducibly* different *ways of being* that property—much like the different properties of an object are *ways of being* that object—then it is tempting to view the dispositional and qualitative as supplying different 'natures' or aspects which inhere in that property. After all, each appears devoid of something crucial that the other supplies: The qualitative confers individuation, the 'shell'; while the dispositional bestows power on its bearer. But Heil rejects any dual nature. A property just *is* a certain dispositionality that just *is* a certain qualitativity and these are a singular nature—power-qualities that both enable and objectify the properties of things.

It appears contradictory to suppose that the qualitative and the dispositional are each 'irreducible' and yet strictly identical, since the meaning of strict identity is, surely, for things to be reducible to each other. One way to relieve this tension is to resort to some kind of epistemological explanation: that 'qualitativity' and 'dispositionality' are two different *terms* referring to the very '*selfsame thing*'. When considering an object in terms of its power we talk about its dispositions, and when considering how it is detected by our senses we talk about its qualities. Thus, we *talk* of the dispositional and the qualitative as each contributing to the world *uniquely*. Martin uses the example of an ambiguous goblet/two-faces drawing to illustrate how differently considering the selfsame object may render two different outcomes:

What is qualitative and what is dispositional for any property is less like a two-sided coin or a Janus-faced figure than it is like an ambiguous drawing. A particular drawing, remaining unitary and unchanged, may be seen and considered one way as a goblet-drawing and differently considered, it is a two-faces-staring-at-one-another-drawing. The goblet and the faces are not distinguishable parts or components or even aspects of the drawing, although we can easily consider the one without considering, or even knowing of, the other. The goblet-drawing is identical with the two-faces drawing.

Heil's example is along very similar lines: 'The model, if you want one, is an ambiguous figure —a Necker cube, for instance—that can be seen now one way, now another'. Construing the problem as a matter of epistemology seems consistent with Heil's view that 'A property's dispositionality and its qualitativity are, as Locke might have put it, the selfsame property

differently considered.

If the dispositional and the qualitative were each indeed contributing uniquely in some ontologically-robust manner, then the issue of whether properties were single-natured or dual-natured would be perhaps unresolvable. In the light of the above, however, we could regard the *apparently* unique contributions as merely abstractions from our conventions of talking about or 'considering' the properties of things. However, accepting the contributions of the qualitative and the dispositional as *non-unique* imposes the limitations of the qualitative upon the dispositional, problematising what it means to be a power. This is the topic of the next section.

5   Non-Relational Dispositionality

Heil gives reasons for accepting non-relational dispositionality: First, to view a dispositional property as a relation to some manifestation (or possible manifestation) is a mistake, for it would be to confuse the disposition with its manifestation (p. 81-83). Second, dispositional properties exist whether or not the circumstances are such that the power bestowed upon the property-bearer is manifested. As Heil notes:

There is, I believe, no compelling reason to regard dispositions…as relational. Dispositions can be conditionally characterized in a way that invokes their actual or possible manifestations. But this does not turn dispositions into relations. The existence of a disposition does not in any way depend on the disposition's standing in a relation to its actual or possible manifestations or to whatever would elicit those manifestations (p. 83).

I do not think that dispositional properties must be non-relational in order to account for unmanifested dispositions. Since 'dispositional partners' are necessary in the manifestation of power, given the absence of an appropriate dispositional partner, it is over-determination to further require a disposition to be non-relational in explaining the absence of its manifestation.

But accounting for the mere possibility of unmanifested dispositions is not the whole story. As Heil notes, critics of power theories may argue that because connections or relations have been re-located inside properties rather than being external and contingent, every property must include all its *possible* relations (p. 123). Unmanifested relational dispositions seem, therefore, to push in a Meinongian direction, since they appear to stand 'in relation' to the possible manifestation that does not yet, if ever, exist. A way to avoid Meinongianism, therefore, is to deny that dispositions are relational.

However, the power-net put forward by Martin and adopted by Heil , I submit, removes Meinongian possibilities even if dispositions *are* relational. The identity of a disposition is given by the contribution it makes to the powers of the object that bears it. But an everyday object is complex, with multiple properties, and as Heil notes, its power is due to its overall dispositional make-up. Its behaviour is determined by the interactions *among* its properties and the properties of other objects. So it is not the case at any time that the manifestation of any single disposition occurs. Rather, it is the power of an *object* that is manifested due to contributions from *all* its dispositional properties. Importantly, therefore, *whether* an object manifests its power is not an appropriate question, for no object is ever *not* in relation to something else. An object *always* manifests its power, in concurrence with the multitude of dispositional partners to which it stands in relation. Since its power results from its *complete* dispositional make-up, no disposition of the object is ever unmanifested. Accusations of Meinongianism are thus unfounded when viewing dispositions as relational.

But Heil does need non-relational dispositions for strictly identifying the dispositional with the qualitative. Since the qualitative by definition is intrinsic and non-relational, dispositions must be both intrinsic and non-relational.

Theories, like Shoemaker's, that propose an intrinsic but relational view of power, are under a burden to explain how distinct objects become individuated without qualities. Theories, like Armstrong's, that propose qualitative properties linked by contingent laws of nature, are under a

burden to explain the necessity in the linking pattern. Likewise, Heil's Identity Theory of Properties is under a burden to explain how non-relational power-qualities differ from pure-qualities (Armstrongian categorical properties), since both are intrinsic.

Heil's answer is roughly that pure-qualities (if they existed) would require, as Armstrong supposes, contingent laws of nature linking them. Together these categorical properties and laws would bestow power on the property-bearers. In contrast, Heil's power-qualities do not require contingent laws to bestow power. They do so through their own natures (p. 79) whose powers are 'built into' them (p. 124).

This answer leads to the problem of what it might mean to have a non-relational but powerful nature. This puzzle is closely tied to how such properties are supposed to bestow power upon their bearers. Heil claims it is simply a brute fact that his power-qualities bestow power: 'An identity theorist agrees that there is no further explanation for the fact that certain qualities endow their possessors with certain powers' (p. 117). But, as Heil notes, this is no more mysterious than competing views. Indeed, he presents only one brute fact: 'power-qualities bestow power on their bearers', whereas Armstrong presents both categorical properties and the laws of nature linking them, entailing at least two brute facts (p. 117).

Counting aside, the non-relational facet of Heil's dispositions demands some explanation of *how* power-qualities differ from pure-qualities. If that difference lies in their ability to bestow power without contingent laws of nature, then some detail of the action of 'bestowing' *is* required. Otherwise the theory presents essentially a deus ex machina leaving the notion of power-qualities incomprehensible.

There is further concern about positing power-qualities as non-relational: Given that an object's power comprises an overall dispositional make-up, how do non-relational power-qualities 'get-together' accordingly? Heil has ruled out contingent laws between properties, and there seems to be no room for necessary laws by dint of properties being non-relational. Therefore we lack the conceptual resources to formulate how power-qualities could constitute the overall dispositional make-up of objects.

There are, therefore, some very good reasons for considering dispositions as relational: First, when we talk of properties as the 'ways that objects *are*', surely we mean 'ways that an object *can relate* to other objects'. Properties must surely, then, be relational. Second, relational dispositions offer a rationale for the ability of dispositions, *of their own nature*, to bestow power on their bearers. The overall dispositional make-up of an object is comprehensible if its dispositions relate to each other in certain ways. However, by strictly identifying the dispositional with the qualitative, Heil binds the dispositional to a non-relational status. I find this a problematic outcome of his identity thesis.

6 3-to-1 Dimensional Asymmetry

As I claim, it is primarily the need to accommodate the qualitative that leads to the problematic characterisation of the dispositional in non-relational terms. I have also asserted that the role of the qualitative as individuator of powers is required only for theories that propose a world of distinct objects and distinguishable powers or potentialities.

Heil's 'deep' description (Section 16.8) of a world constituted by a field or space-time manifold as the single existing object does not seem to incur the problems engendered by one of multiple and distinct objects. If manifest everyday objects turn out to represent properties (modes)—ways that this field is—then, I argue, the world would not need the qualitative as individuator of powers. Nor would there be, in turn, the onus to resolutely account for power in terms of non-relational dispositionality. It makes no sense to ask of a monistic world whether power is relational *between* objects, since the field is everywhere, being the only object in the world. And since there is only one object, all relations are within it, making the distinction between intrinsic and extrinsic relations refreshingly irrelevant.

The question that remains active concerning Heil's 'deep' description of the world is whether we still need the qualitative to individuate the modes or properties of the field—our manifest everyday objects—which appear to be distinct or at least distinguishable from each other. If the qualitative is required for this individuation, then Heil's power-qualities are in play after all, and we return to the problems that are incurred by these being non-relational.

I suggest that we *can* explain how modes are distinguishable one from another, without recourse to traditional qualitative properties, by considering the space-time dimensional structure. (Perhaps, in echoing views put forward by Graham Nerlich , we can think of space-time dimensional structure as a 'unique ontic category' of *some* sort, but this topic is for another paper.) The ostensible spatial priority of the world is expressible in terms of space comprising (at least) three dimensions and time being a single dimension. This idea derives from an unpublished manuscript by Merin Nielsen[4] as a reasonable account of *why* we tend to regard mass, shape, size, solidity and so forth as requiring 'something qualitative' without falling back to a discussion of dispositional versus qualitative properties. Here I hope to support Heil's emphasis on accounting for both spatial priority and fundamental power in the universe, while avoiding the problems of non-relational power-qualities.

By virtue of space-time's numerical asymmetry, we are incidentally yet inescapably disposed to identify the world's contents first and foremost in terms of spatial arrangements of events. This presents an intuitively forceful, yet ultimately illusory, distinction of ontological status between arrangements of events in space and those in time. The former tend to be called 'qualitative', and the latter 'dispositional'.

Although derived from the prior 3-to-1 asymmetry, however, the distinction is really an artefact of the properties corresponding to our sensory perception.

Whenever it seems to manifest in 'space-only', power *appears* intuitively qualitative. Although power manifests always in space-time, we arrive most readily at the false impression that mere space-filling entails 'substance'. This impression arises because space, as a result of comprising three dimensions, seems more *primary* than time such that objects apparently 'sit still' in space, occupying certain spatial regions in an 'orthogonally extended' fashion, whereas they never sit still in time. Sitting still in space just is persisting as a physical 'particle'. Sitting still in time, however, corresponds to no physical state.

So how come objects may sit still in space (extending indeterminately through time), but not in time (extending indeterminately through space)? In other words, how come there are particle-like objects, that seem embedded in space, but no temporally-embedded counterparts? By way of an answer, please consider the following.

Given some point-moment event X and some quantity of time T, there are just two events located at the same point as X, and which are separated from it by T. These two events are located at T in the future from X and at T in the past from X. However, given some point-moment event X and some quantity of space S, there are many events located at the same moment as X, and which are separated from it by S. These many events are located at all the points forming a sphere of radius S around X.

Schematically, in the latter case, X is surrounded by a 'network' of events which are simultaneous and equi-spatial also from each other. Consequently, in the context of fundamental particles, we have the potential for a 'one-way circulation network' among the many events *equi-spatial* from X. Such a network, analogous to a circular-driveway, is available in two or more dimensions that supply an angular metric, more dimensions allowing more complex circulation. There is no prospect, however, for any similar circulation network among the merely two events *equi-temporal* from X, which exist at the same point as X. (One dimension allows for only a linear network, much like a drive-in-back-out-driveway.)

What is circulating? Suppose we consider equi-spatial events, at consecutive 'stages' of circulation, to be network vertices. Then each connecting 'edge' may be just an interaction of space

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4   This account has been discussed and developed in collaboration with Nielsen.

and time. If equal quantities of these are involved, then the absolute 'space-time interval' between vertices is zero. Such an interaction manifests as energy-momentum. Subject to scientific interpretation, what is circulating may be viewed as gauge bosons.

Now suppose that such circulation networks are 'self-sustaining'. Then *without loss of identity* they may self-sustain through time (thus 'persisting'), but not through space. This is because any stage of circulation maintains the equi-spatial separation from X, but involves a temporal translation equivalent to the time taken. The network is thereby a persisting object whose 'identity' is represented by its preserved spatial arrangement of events. 'Concrete' particles thus arise from the self-replication of such spatially confined networks, clusters of which appear as matter.

The upshot of the 3-to-1 Dimensional Asymmetry is that such networks may exist only as persisting *spatial* arrangements of energy-momentum. By virtue of this 'immanent causation', they appear as stuff that extends 'gratuitously' through time, upon which entropy imposes a well-defined direction. But we too are such spatially confined networks. As a result, we readily perceive motion-through-space, but not motion-through-time. We are 'primed' by expediency to perceptually encounter the world by interacting with other particle-like networks, giving rise to the intuition of spatial primacy. The 3-to-1 asymmetry is thus translated into a bias that favours identifying substance as spatially oriented.

7   Summary and Conclusions

Heil's attempt to integrate fundamental power into a world that we encounter as deeply and essentially spatial is a very important pursuit. I have argued that it falters in trying to unite the qualitative and powerful by arguing for non-relational power. Power-qualities and pure-qualities differ in terms of how they may bestow power. Yet, Heil offers no explicit account of this action of bestowing.

I have argued that a major reason for Heil requiring the dispositional to be non-relational is that his identification of the dispositional and the qualitative cannot otherwise proceed. However, requiring the existence of the qualitative is based upon the need to individuate distinct objects and powers, and therefore does not necessarily arise for monist theories. I have outlined a model addressing the need to account for the substance role, namely, the asymmetrical interaction of space and time. This works in the spirit of Heil's endeavour to characterise the world as qualitatively potent, removing from discussion the dichotomy embedded in terms like 'dispositional' and 'categorical' or, for that matter, 'qualitative'. We can adequately explain deep-seated intuitions concerning the role that substance plays while coherently positing a monist theory of properties.

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