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THE INDIVIDUATION OF TROPES

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A *trope*[1] is a particular property: the redness of a rose, the roundness of the moon. It is generally supposed that tropes are individuated by primitive quantity: *this* redness, *that* roundness. I argue that the trope theorist is far better served by individuating tropes by spatiotemporal relation: *here* redness, *there* roundness. In short, tropes are not this-suches but here-suches.

I generally favour an ontology, much like that of David Hume and very much like that of D. C. Williams, on which tropes are fundamental entities, and resemblance and spatiotemporal distance are fundamental relations, with properties analysed as resemblance classes of tropes, and objects analysed as compresent bundles of tropes. I do not argue for this ontology here except obliquely, by showing how the spatiotemporal individuation of tropes can overcome certain standard objections.

In what follows I display the structure and rationale of trope theory, argue that the this-such conception of the trope is ill-suited to the rationale of the theory and independently objectionable, explain how the here-such conception is preferable, and conclude by considering objections.

I. The Structure and Rationale of Trope Theory

The trope theorist takes tropes to be fundamental entities. The redness of a rose is not to be analysed in terms of a universal *redness* inhering in a particular substance, or in terms of members of resemblance classes of concrete objects. What is the redness of a rose? *Look*.

Thus one rationale for trope theory is the claim that tropes are the immediate objects of perception. When one eyes a rose, it seems that one perceives, not the universal redness, nor some unstructured whole (as per the rival universalist and nominalist conceptions), but rather the particular redness in question (and particular shape, etc.). This point can be found in Boethius, who has good claim to being the first trope theorist: ‘ . . . their nature can be gazed on and their distinguishing peculiarity comprehended.’ [7, p. 24] D. C. Williams, who has good claim to being the most important modern trope theorist, echoes this thought: ‘What we primarily *see* of the moon . . . is its shape and color and not at all its whole concrete bulk . . . ’ [18, p. 123]

The trope theorist then takes general properties to be derivative from tropes plus a primitive resemblance relation. Redness is to be defined in terms of a class of resembling

[1] The etymologically unfortunate ‘trope’ is a joke foisted by D. C. Williams. The medievals, following Aristotle’s *Categories*, referred to these entities as ‘first accidents’, and more recently G. F. Stout has called them ‘abstract particulars’, Gustav Bergman ‘perfect particulars’, Nicholas Wolterstorff ‘cases’, and Guido Küng ‘concrete properties’, to name just a few alternatives.

tropes. Thus a second rationale for trope theory is that it provides an account of properties without recourse to universals, whose repeatability is problematic ('scandalous', according to Keith Campbell). The trope theorist forswears entities that may be said to be simultaneously a mile away from themselves (even in a Euclidean spacetime), without denying that objects have any structure as per nominalism.

The trope theorist then takes objects to be derived entities, from tropes plus a primitive compresence relation.[2] The rose is defined as a bundle of compresent colour, shape, mass, and whatnot. Thus a third rationale for trope theory is that it avoids substrates (Locke's 'something we know not what') while being able to differentiate qualitatively indiscernible nonidenticals on the basis of difference in individual trope. (Stout [16, pp. 156–8], also Campbell [8, pp. 131–3].)

Finally, the trope theorist typically identifies events (the relata of causation) with tropes. Thus when the bullet causes a death, it will be said to be the particular shape and velocity of the bullet, and not pointedness and rapidity in general, that are causally related to the particular qualities of the death. Tropes are the levers of the world. This view can be found in Albert the Great: 'The causes and principles and elements of things, . . . are things particularly constituent and certain particulars.' [1, p. 49] Williams [18, p. 172], Campbell [8, pp. 128–30] and Douglas Ehring [11, pp. 71–90] have also defended this view.

The various rationales for trope theory are each problematic (though I think ultimately correct), and I make no attempt to defend them here. Rather my purpose in this section is merely to display these rationales, since I am concerned in what follows to show just how much better the here-such conception of the trope fits these rationales than does the this-such conception. Here-such is the thematic conception of the trope.

II. Individuating Tropes

What are the principles of individuation for tropes? The standard view is that tropes are individuated by primitive quantity. This view is found in such eminent defenders of trope theory as Stout, who simply labels tropes 'numerically distinct' [16, p. 178], Williams, who speaks of the trope as '*this* redness, *this* roundness' [18, p. 123],[3] and Campbell, who once advocated spatiotemporal individuation but (for reasons to be considered later) has retreated to the primitive quantity view. [9, p. 69] This view is also implicit in such eminent critics of trope theory as Armstrong, who worries that trope theory countenances the seemingly empty possibility that *this* redness could be swapped with *that* redness. [3, pp. 131–2]

The standard quantitative individuation principle (**QI**) can be stated as: x and y are distinct tropes iff they are primitively quantitatively distinct.

[2] This is what John Bacon calls 'classic trope theory' [5, p. 2]. There is an alternative view, found in C. B. Martin [13] and endorsed as the best version of trope theory by D. M. Armstrong [3, p. 116], on which substrates are also accepted as fundamental entities, with objects understood to be bundles of tropes co-inhering in the same substrate.

[3] Campbell recounts a conversation in which Williams 'was inclined to hold that *being a particular* was a basic and unanalysable fact about every particular. It did not *depend on* unique dimensional location, though this was its typical and familiar manifestation.' [9, p. 56]

QI is to be contrasted to the spatiotemporal individuation principle (**SI**), which can be stated as: *x* and *y* are distinct tropes iff they are either not exactly resembling, or at distant locations (Distance(x,y)>0).[4]

I say that QI is the standard view but actually one is hard pressed to find any explicit statement at all on trope individuation (to my knowledge only Campbell has explicitly addressed the issue).[5] In fact, what one finds in virtually every presentation of trope theory is a gloss of the trope as the quality *of a particular object* (much as I started by talking about the redness of a particular rose). But this is seriously misleading, since the trope theorist thinks of objects as entities derived from tropes. Obviously the individuation principles of tropes must not depend on objects in any way.[6]

QI, however, is ill-suited to the rationale of trope theory and independently objectionable. First, the primitive quantitative identity of the trope is epistemologically problematic, in that one cannot perceive these quantities. Thus QI is ill-suited to the first rationale of trope theory stated above, which is that tropes are supposed to be the immediate objects of perception.

Contrast QI with SI. It would seem that what one immediately perceives, to take the case of vision, is particular qualities arrayed in a visual field. Thus spatiotemporal relations are perceivable whereas quantitative identities are not. You can see whether it is *here* or *there*, but not whether it is *this* or *that*.

A second rationale for trope theory is the avoidance of repeatable entities, but it is to say the least nonobvious whether QI succeeds in this regard. What principle determines that the primitive redness of the rose is *this* and of the sunset *that*, rather than both being one and the same *this* (a scattered individual)? Moreover, if such quantitative identities extend through time then it would seem that repeatability is possible in looping spacetimes.[7] Suppose, as many philosophers have thought conceivable, and as Kurt Gödel proved consistent with general relativity, that a time traveller may view her younger self at t_0. Then at t_0 there will be one and the same time traveller at a distance from herself, and presumably one and the same tropes that constitute her in the very situation that the trope theorist criticised the theory of universals for countenancing.

SI, in contrast, succeeds in avoiding repeatable entities. The redness of the rose is distinguished from the redness of the sunset by location, as is the curiosity of the younger and older time traveller at t_0. The real concern with repeatability, as can be seen in the complaint that nothing can be a mile away from itself, is a concern with the coherence of multiple location. Thus individuation by location is just the right solution.

[4] The added 'not exactly resembling' disjunct serves to allow that, for instance, colour and shape tropes are compresent.

[5] Bacon explicitly avoids the issue by suggesting vague and intuitive trope individuation, while claiming that trope individuation is at least intuitively more manageable than universal individuation [5, p. 3]. Since SI is both a precise principle of trope individuation and (unlike QI) unavailable for universals (which are by definition repeatable), SI would render Bacon's complaint against universals far more forceful.

[6] The trope theorist who also accepts substrates (see note 2) may use these to individuate tropes: *x* and *y* are distinct tropes iff they are either not exactly resembling, or inhering in distinct substrates. All the criticisms of QI apply here too (the substrate being itself just a bare thisness).

[7] I owe this point to Adam Wager.

A third rationale for trope theory is to avoid substrates while being able to differentiate qualitatively indiscernible nonidenticals on the basis of difference in individual trope, by defining objects as bundles of compresent tropes. Here the spatiotemporal relations (which determine the compresences) do all the work, and the quantitative identities do none. So on this rationale the trope theorist is already independently committed to invoking distance relations but not to invoking primitive thisnesses. Thus SI streamlines the ideology of the theory.

The fourth rationale for trope theory is to identify the relata of causation, and here once again it seems (as a glance at Newtonian laws suggests) that the causal efficacy of the trope is due to its nature together with its distance relations with other tropes, not to its quantitative identity.

Moreover, trope theory has come under fire from D. M. Armstrong for countenancing two seemingly empty possibilities: *swapping* and *piling*. According to the swapping objection, trope theory countenances the seemingly empty possibility that *this* redness of one rose and *that* exactly resembling redness of another could be swapped. Trope theory with QI rules that the result of the swap is an ontologically distinct situation.[8] But this 'possibility' seems empty because the swap changes nothing in the empirical or causal situation (in this regard swapping seems to be a manifestation of the epistemic inaccessibility and causal inefficacy of the primitive quantitative identity). The difference seems purely verbal.

It might be thought that SI precludes swapping immediately (Campbell [9, p. 71]). If we have redness *here* and *there*, then a 'swap' yields just redness *here* and *there* again, which is not a distinct situation. I think this is essentially correct but not so immediate.

We must distinguish between inter- and intra-world principles of individuation. The view recommended here is a view of *intra*-world individuation: within a given world, no two exactly resembling tropes are at zero distance. *This entails nothing yet as to whether tropes at different worlds are the same or different*. In fact, on certain conceptions of possible worlds such as David Lewis's, possible worlds are necessarily spatiotemporally disconnected, so that no two tropes at different worlds could possibly be in any distance relations at all strictly speaking (though analogous location is possible).

So for now all that can be said is that while SI does not obviously allow swapping, it does not obviously preclude swapping either. I will return to this issue in the next section.

According to the piling objection, trope theory countenances the seemingly empty possibility that our rose is both *this* red and *that* red. As Armstrong says:

> [I]t seems clear that the very same particular cannot instantiate a property more than once. To say that a is F *and* that a if F is simply to say that a is F. Given the Identity view of properties, this is immediately explicable. For a Particularist, however, an ordinary concrete particular is a collection of Stoutian particulars. Why should not this collection contain two Stoutian particulars which resemble exactly? [2, p. 86]

[8] Martin suggests that substrates preclude swapping, so long as we posit the redness of the rose as necessarily inhering in *that* substrate ('nontransferable'). But this not only requires the positing of a new brute necessity, it also fails to preclude swapping provided that the substrate is thrown into the swap. And substrates (which are just as inaccessible and inefficacious as trope thisnesses) generate additional swapping problems of their own: all substrates are swappable.

Peter Simons seems to agree that piling must be excluded, in asking, 'What is to stop several tropes of the same kind, e.g. rednesses, from being compresent in one bundle?' [15, p. 558]

Here SI furnishes an immediate reply. A 'pile' of rednesses is just a redness here and a redness also-here, which are now seen to be identified. SI flattens the pile.

I will return to piling later as well, because critics of SI such as Chris Daly claim that piling is a genuine possibility. For now suffice to say that the critic of tropes cannot have it both ways! I concur with Armstrong and Simons that piling is an empty possibility, and so I consider the flattening of piles a further success for SI over QI.

Thus I conclude that the thisness of the such serves to individuate the such, but in a way that undermines much of the hope of trope theory, contributes nothing further to its gains, and raises independent difficulties. The hereness of the such also serves to individuate the such, while furthering the gains of the theory and resolving what have seemed to many to be significant objections. In this regard when one considers the structure and rationale of trope theory, it becomes clear that hereness is the thematic way to individuate the trope.

III. Objections to Spatiotemporal Individuation

There are four main objections to SI. First, there is the worry that SI requires a problematically substantival spacetime. Second, there is the objection that nonspatiotemporal tropes are real possibilities (this being the objection that changed Campbell's mind). Third, there is the objection (*sliding*) that the redness of the rose could have been *there* rather than *here* had the wind blown differently. Fourth, there is the inverse of the piling objection solved above, where piles are now insisted on as genuine possibilities.

In regard to the first objection, I reply that distance *relations* do all the work in the theory, so that no problematically substantival conception of spacetime is required:[9] no two exactly resembling tropes are at zero distance from each other. The distance relations are sufficient for individuation and for bundling, and may well be what are immediately perceived and what are causally efficacious. Nor should the trope theorist have any objection to primitive distance relations, since (at least for the bundle theorist) he or she already accepts a primitive compresence relation.

Turning to the second objection that nonspatiotemporal tropes are possible, I reply that I am not convinced that this is a genuine possibility.[10] Here I follow Armstrong in endorsing *naturalism*, the thesis that the world is the spacetime system (which for Armstrong makes naturalism true at all possible worlds since his possible worlds are just scrambles of actual spatiotemporal entities). Campbell, who takes the possibility of nonspatiotemporal tropes as *the* devastating objection to SI, considers naturalism a 'dialectically impossibly weak position' against the advocates of angels and their ilk. [9, p. 54] But those of us who favour naturalism are not, as Campbell is supposing, arguing

[9] Of course SI is consistent with a substantival view of spacetime. My point here is that SI does not *require* substantival spacetime.

[10] In fairness I must note that, at least for Williams, one of the rationales of trope theory is to provide a Hume-style bundle account of the soul. [18, p. 18] It is not clear whether Williams thinks of souls as in spacetime or not.

for naturalism on the basis of an ontology of spatiotemporally individuated tropes alone (that argument may well be impossibly weak). Naturalism is a plausible doctrine in its own right, and its plausibility generates additional dialectical leverage. In fact one of the standard objections to possible non-natural entities concerns their individuation: what would differentiate my 'disembodied soul' from yours?

Further, the advocate of SI has the option of being more tolerant of such entities, by following a suggestion due to Campbell himself:

> [T]o the extent that there can be non-spatial particulars, to that extent there must be some analogue of the locational order of space. And in that case, there will be an analogue of location to serve as the principle of individuation for non-spatial abstract particulars. [8, p. 136]

Campbell came to renounce this idea as merely formal:

> But the orders angels might fall into, of the intensity of their powers, [etc.] . . . while formally they may do the job of providing for each a unique and particularizing 'location', seem somehow too extrinsic to carry conviction as what sets each angel apart from all others. [9, p. 56]

Here my naturalistic scruples are pushed to the limit and I must confess to not caring about whether the number of angels dancing on the heads of nonspatiotemporal pins has been counted over-formally or not. Here I share the attitude of Lewis, who, subject to a similar objection on the basis of his spatiotemporal unity conditions for worlds, retorts:

> I am not sure why I need to defend the possibility of spirit tales—after all, people have been known to accept impossible theories, as witness naïve set theory—but in fact I think I give them at least as much room in logical space as they deserve. [12, p. 73]

As I see the dialectical situation at this point, the options are: trope theory plus SI plus a tolerant naturalism that countenances nonspatiotemporal entities by spacetime analogues, versus trope theory plus QI. The package with SI trades in an additional primitive that is epistemically inaccessible, causally inefficacious, swappable and pileable, for a perhaps overformal numbering of angels. I submit that Campbell, otherwise so excellent an advocate of tropes, came to make the wrong choice here.

In regard to the third objection that the redness of the rose could have been *there* rather than *here*, I reply that this objection confuses inter- and intra-world principles of individuation. The view in question entails only that, at any given world, no two exactly resembling tropes share the same location. This entails nothing as to whether tropes at different worlds are the same or different.

I suggest that the thematic way for the advocate of SI to address 'transworld identity' is with Lewis's counterpart theory, on which tropes at different worlds are always strictly nonidentical, but may nevertheless be considered 'the same' (in Butler's 'loose and popular' sense) in virtue of certain similarities.

The relevant aspects of similarity for the trope theorist ought to be some combination of his or her fundamental relations of resemblance and distance. (Perhaps resemblance has

both an inter- and intra-world component, but distance will have to be purely intraworld.) On the counterfactual supposition of a shift in wind, what results is a redness exactly like the actual one, which is in perfectly isomorphic resemblance relations to its worldmates as the actual one is to its worldmates, with just a slight difference in distance with respect to, e.g., the roundness of the moon. Surely this resulting redness will be the runaway winner of the counterpart-of-the-actual-redness contest. Thus counterpart theory allows for sliding, because the nearest relative of the redness of the rose which is *here* at our world, is the redness of a rose which is *there* at the wind-shifted world(s) in question.

But, to return now to the issue of swapping, counterpart theory disallows swapping, because the nearest relative of the redness of the rose which is *here* at our world would be the redness still *here* 'post-swap'. The redness which would be here has exactly the same inter- and intraworld resemblance relations as the redness which actually is here, and the same distance relations, and hence it is a better counterpart than the redness which would be *there*.

Thus SI, coupled with counterpart theory, succeeds in striking the delicate balance of allowing sliding while disallowing swapping.

The final and to my mind most important objection that piling (shown in the previous section impossible on SI) represents a genuine possibility is expressed by Chris Daly:

> [W]e cannot say that a given trope is the one it is because it occupies a certain space-time location. More than one trope can occupy the same spatio-temporal location, and it even seems possible for a pair of exactly resembling tropes to occupy the same spatio-temporal location. [10, p. 155]

As such this objection strikes me as merely question-begging. No independent considerations have been given yet for thinking that two exactly resembling tropes can occupy the same location, so I reply that if one thinks of tropes thematically it seems impossible.

Compare the alleged intuition that piling is possible with the reasons Armstrong offers (as a criticism of trope theory!) for denying piling. Here is our rose, which is to be regarded as a bundle of compresent tropes. Suppose the piling of exact rednesses is possible. Then it seems that we have countenanced an infinity of empty possibilities, corresponding to the possible heights of the piles, which (just like swapping) change nothing in the empirical or causal situation.

If there are theoretical benefits to countenancing piles, Daly's intuition of their possibility might be worth clinging to, but otherwise I say this is a case where intuitions are at best divided, and where the theoretical benefits of disallowing piles are clear: not only is SI allowed, but infinitely many empty possibilities are excluded.

But perhaps there is some theoretical reason to countenance piles. Armstrong (ironically enough!) suggests one reason in discussing *purely intensive differences* in properties. Suppose that two point-particles could differ in mass. Armstrong notes that his own view of the determinate/determinable relation as derived from partial identities between determinates goes awry in such a case, since these different masses are determinates of massiveness, but not in any obvious way partially identical. (His surprising response is 'I take courage and declare that this metaphysic has no place for such quantities.' [4, p. 64]) Armstrong then suggests an alternative trope-pile analysis: '[O]ne might explain a difference of mass in different point-particles by saying that the

particles in question contained a different number of unit-mass particulars "piled on top of one another".' [4, p. 65][11] So now, at last, we have found some theoretical reason to allow piles. How good is it?

The first reply that is open to the advocate of SI is simply to follow Armstrong in denying that purely intensive differences are possible. I confess that this strikes me as highly implausible.

A second reply is that the trope-pile analysis of purely intensive differences just does not work anyway. Consider an object whose 5g mass is now to be analysed as a five-high pile of 1g masses. On any plausible theory of predication,[12] since the object has a 1g mass, it follows that it can be truly said that 'the object is 1g' (and 2×1g, 3×1g, 4×1g, and 5×1g). But of course the object is 5g, not 1g. Perhaps one can complicate one's theory of predication somehow to disallow proper-pile-parts as predicates, but now the theoretical gain of allowing piling seems to have been dissipated in the newfound complications of predication.

I suggest as a third reply that the trope theorist has a much better account of purely intensive differences in any case, based on inexact resemblances rather than pilings. Here is my point-particle with mass x, and there is my point-particle with mass y ($x \neq y$). The trope theorist should explain this in terms of each bundle of compresent tropes at their respective points having a particular massiveness that inexactly resembles the other. Perhaps the resemblance structure of all pairs of inexactly resembling massivenesses will form a structure partly isomorphic to the number line, in which case this purely intensive difference can be modelled numerically.

I think that if there is a real reason to countenance piles it is to model the behaviour of *bosons*. Physicists distinguish *fermions*, which obey Pauli's Exclusion Principle (no two fermions may occupy the same quantum state), from *bosons*, such as photons, which do not. So multiple indiscernible bosons can occupy the same place at the same time, and so the piling of bosonic tropes seems to be not just a conceptual possibility, but an empirical reality.[13]

A 'two-high pile' of bosons is empirically distinguishable from a single boson, as are piles of *m* and *n* bosons, for $m \neq n$, because the wave-functions involved superpose (in the terminology of note 11, piles of bosons are not stacks but pyramids). What should the trope theorist say about 'boson piles'?

[11] When Armstrong dismisses the possibility of the rose having a pile of exactly resembling rednesses, he is supposing that the rose with many rednesses is indiscernible from the rose with one, rather than supposing that the rose with many will appear to possess, e.g., a shade of red many times as saturated as the rose with one. But when Armstrong considers the possibility of the point-particle having a pile of exactly resembling massivenesses, he is supposing that the particle with many massivenesses will be many times as massive as the particle with one, rather than supposing these indiscernible. Call the first type of alleged pile, whose multiplicity is hidden, a *stack*, and the second type of alleged pile, whose multiplicity is discernible, a *pyramid* (viewed from above, only the top of a stack is visible, but the entire surface of a pyramid is). The advocate of spatiotemporal individuation looks to get the right result in excluding stacks, but needs some alternative non-pyramidal understanding of purely intensive differences.

[12] Williams suggests an elegant trope theoretic account of predication: a is F iff the bundle of compresent tropes in a and the set of exactly resembling tropes in F overlap.

[13] In the ensuing discussion I am indebted to Frank Arntzenius and Tim Maudlin.

To begin with, QI is no improvement, since (with objects taken as compresent bundles) the trope theorist who individuates quantitatively sees one big compresent bundle with double the usual tropes: one 'superboson' rather than two bosons. The trope theorist might complicate his or her theory of objects to take them to have certain 'completion principles' and claim to see two complete bundles compresent, but it is to say the least nonobvious what these completion principles are, and what status these principles could have other than new brute necessities. And even if these questions could be answered, the question would still remain as to which completion comprises a boson: the point contains *this* charge and *that* charge, and *one* spin and *another* spin, etc., but is one of the bosons completed by *this* charge and *the one* spin, or *this* charge and *the other* spin?[14] So there seems no gain in retreating here.

I suggest that the trope theorist apply the account of purely intensive differences sketched above to the 'boson pile'. What I am suggesting is that the trope theorist take the single superposed wave function, rather than the 'pile of particles', to be the real object in question.[15] This single wave function is then understood as a bundle of suchnesses (one for each dimension of its configuration space). Like the quantity of mass discussed above, the quantity of particles is to be understood in terms of systematic inexact resemblances between waves.

The idea that the wave function is the real object and the particle derivative is a well-respected conception of the physics. It explains the otherwise puzzling Bose statistics. Suppose we have a 'two-boson pile' in one compartment, and open the door to a second compartment. What are the odds that both bosons will wind up in the second compartment? The intuitive answer (based on partitioning the state space into a 2-boson by 2-box grid and assuming indifference thereover) is 1/4. The physical answer is actually 1/3, and the wave representation explains this. The outcome is a standing vibrating wave, either with a hump in the left and right hand sides, or with a double-size hump on the left side only, or with a double-size hump on the right side only. Thus the statistics make sense.[16]

The wave view is then rendered explicit in quantum field theory, on which 'particle number' is treated merely as an operator, *a feature of the wave function*. This operator can even have non-whole number expectation values. As Teller concludes:

> Now what happens when, as the particle theorist would like to say, one creation operator operates twice to create "two particles in the same state"? It is at least as good a description to say that the level of excitation of one of the field's oscillators has been increased by two units. [17, p. 317]

[14] Substrate-based individuation is even worse here, because either there is one substrate present and so only one 'superboson', or there are multiple substrates compresent which contradicts the usual view that substrates exclude each other and so raises infinitely many empty possibilities of substrate stacks.

[15] Paul Teller, in discussing whether bosons refute Leibniz's Principle of the Identity of Indiscernibles, asks just the right question: 'Why say there are two waves composing the bump in the middle as opposed to two prior waves added together to get a partless whole?' [17, p. 311].

[16] Michael Redhead and Paul Teller point out that, by taking non-symmetric vectors to represent meaningful though never physically actualised states, a particle-based approach can explain the statistics. They conclude, though, that this explanation is inferior since it postulates 'surplus structure' [14].

Thus I maintain that the trope theorists has a much better account of 'boson piles' in any case, one which follows the contours of the thematic trope-based approach to purely intensive differences sketched above, one which SI suggests, and one which the statistics of bosons confirms.

But the wave view also brings with it a serious complication for SI. The wave function lives in configuration space rather than physical space, and the ontology of the wave function, its relation to physical space, and its relation to the relativistic conception of spacetime which SI so naturally fits remain deeply mysterious. So until we fathom these mysteries, I cannot say whether I think a trope theoretic treatment of quantum theory should individuate tropes by their locations in configuration space, by their probability-spread over physical space, by their real and determinate locations in physical space, or whatnot. In any case it seems that the physics will furnish some SI principle or analogue thereof*, but it is not yet clear which exact principle it will be.*

Such an incomplete result should be expected from metaphysical inquiry. As Williams explains:

> The most that can be done by a thesis in "first philosophy" like ours is to prepare the way for more concrete and synoptic inquiry. We are only beginning to philosophize till we turn from the bloodless proposition that things in any possible world must consist of tropes, to specific studies of the sorts of tropes of which the things in this world actually consist. [18, p. 192]

I conclude that 'here-such' is the thematic conception of the trope, far better suited to the structure and rationale of trope theory than the 'this-such' conception, but that exactly how to understand the 'hereness' involved turns out, somewhat surprisingly, to be an unsettled empirical question.

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