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WHAT IS WRONG WITH THE RELATIONAL THEORY OF CHANGE?

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I

Things, or objects, change their properties: a banana is green one day and some days later it is yellow, a kettle is hot at one time and some time later it is cold, a person is bent at the times when she is sitting and straight at the times when she is standing. How can a banana be both green and yellow all over? By being green and yellow at different times, of course, since for something to change is for it to have incompatible properties at different times.[1] But how is change possible? Given that certain properties cannot be had at the same time, why is it possible to have them at different times? Why and how does a difference in time make it possible what is otherwise impossible? Why is it not a contradiction that a banana is green and yellow, i.e. not green, all over at different times? This is the problem of change and several solutions have been proposed.

Some philosophers, like David Armstrong (1980) and David Lewis (1986, pp. 202-04), think that a difference in time makes possible what is otherwise impossible because a difference in time is also a difference in parts. No doubt it is possible for a thing to be green and for another to be yellow and this, according to these philosophers, is what happens in the case of the banana: it is one thing that is green, a certain temporal part of the banana, and another one that is yellow, another temporal part of

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[1] Incompatible in the weaker sense that they cannot both be had at the same time. Perhaps 'contrary' would be a better word, but since 'incompatible' is more widely used in this context I shall stick to it. But, as Richard Holton, has pointed out, unless we have a trivial notion of property, there may be cases of change when no incompatible properties are involved. Imagine the case of a person that changes from having one finger at time *t* to having two fingers at time *t'*. The properties of *having one finger* and *having two fingers* are not incompatible since anything having the latter has also the second. So unless we are prepared to admit properties like *having one finger and no more* this seems to be a case of change without incompatible properties. Whether or not this is so the paradigmatic cases of change are such that they consist in having incompatible properties (in the weaker sense) at different times. Surely if a theory cannot account for these paradigmatic cases of change, it is not a good theory of change. I shall henceforth speak, for simplicity, as if change always consisted in having incompatible properties at different times.

the banana. Others, among them presentists like Mark Hinchliff (1996, pp. 123-26), think that a difference in time makes possible what is otherwise impossible because a difference in time is also a difference in tense. No doubt it is possible for a thing to be green and not to be other colour and this, according to these philosophers, is what happens in the case of the banana: the banana *is* just green and any other colour is a colour the banana *has had* or *will have*.

Yet other philosophers propose yet another solution. Hugh Mellor, in his *Real Time* (1981, pp. 111-14), thought that a difference in time makes possible what is otherwise impossible because, he thought, a difference in time is always a difference in *relata*. No doubt it is possible for a thing to bear a relation to a thing and an incompatible relation to a different thing and this, Mellor thought, is what happens in the case of the banana: it is one thing with respect to which the banana is green, time *t*, and another thing in respect of which the banana is yellow, later time *t′*.

That is, Mellor in 1981 held what I call the *Relational Theory of Change*. In its canonical version the theory holds that changeable properties are really relations between things and times. It thus explains the change of the banana by saying that it bears the relation *green-at* to a time *t* and the relation *yellow-at* to a later time *t′*. Thus according to this theory, although it is impossible to be green and yellow all over at the same time, it is possible to be green and yellow at different times because this involves different *relata*. The Relational Theory, also held by Peter van Inwagen (1990), has recently been abandoned by Mellor in his *Real Time II*, where he argues against it. In this paper I shall try to show why the Relational Theory fails to account for change, but I shall also criticise the arguments of several philosophers, including Mellor, against the theory.

My aim in this paper is to present a new argument against the Relational Theory of Change. But since the Relational Theory has already been rejected by many philosophers, before presenting my own argument against it I shall show why these other arguments against it are not effective. Thus in section II I shall say something more about the problem of change and the Relational Theory; in sections III-VI I shall criticise the arguments of several contemporary philosophers, including Mellor, against the Relational Theory, and in section VII I shall give my new argument that the Relational Theory fails.

II

The problem of change, which the Relational Theory tries to solve, is sometimes called the 'problem of temporary intrinsics'. The problematic entities are supposed to be properties; they are temporary because they are not had by their subjects at every time, i.e. they are changeable properties; and they are intrinsic because if a thing has such a property this is supposed to be independent of any and every relation the thing in question bears to anything.

But taking the problem of change to be the problem of temporary intrinsics is making relational change either inexistent or unproblematic.[2] Relational change, however, is as existent and as problematic as intrinsic change. That there is relational change is proved just by giving examples, i.e. *a* is hotter than *b* at *t* and *a* is colder than *b* at *t′*. This example, however, does not prove relational change to be something over and above intrinsic change; for here relational change is clearly supervenient upon intrinsic change of *a* and *b*, namely change in a *a*'s and *b*'s temperatures. But there are relations, like some spatial ones, which supervene upon no intrinsic properties of the *relata*. Thus that *a* and *b* are two miles apart at *t* and they are one mile apart at *t′* is genuine, irreducible *relational* change on a Relational Theory of space. And on a Substantival Theory of Space, change of distance is explained in terms of change with respect of the region occupied, where that *a* occupies region *x* at *t* and it occupies region *y* at *t′* is genuine, irreducible relational change. So, in general, spatial change is genuine relational change.

Whatever one's theory of space, change of distance is as problematic as intrinsic change. How can *a* and *b* be both one mile apart and two miles apart? By being one mile apart at a time and being two miles apart at a different time, of course. But how is this change possible? Change consists indeed in having incompatible properties or relations at different times and so the problem of change is to explain change, both of properties and relations. It is particularly important not to neglect relational change, since according to the Relational Theory all change is relational change. In conclusion, the Relational Theory is, or should be, a solution to the problem of change in general, not just to the problem of intrinsic change.

In the case of allegedly intrinsic properties like *being green*, *being hot* or *being bent*, the Relational Theory says that these are really relations to times. Thus for *a* to be green at *t* is for it to bear

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[2] The phrase 'problem of temporary intrinsics' comes, as far as I know, from Lewis (1986, p. 203), but he is well aware that there is a problem of relational change (1999, pp. 192-93).

the relation *green-at* to *t*. In the case of relations like *being two miles apart* the Relational Theory must claim that this is only apparently a two-place relation. Really, the theory claims, it is a three-place relation holding between the things which are two miles apart and the times at which they are two miles apart. In general the theory has it that apparently *n*-adic relations are really *n*+1-adic relations, with an extra place for a time. This version of the Relational Theory, which I shall call the *canonical version*, is the one which was held by Mellor in *Real Time*.

There are two other versions of the Relational Theory.[3] The second version of the Relational Theory says that, although *being green*, *being bent* and the like are indeed properties and not relations, they are not intrinsic properties but *relational* ones. Relational properties are those which are had by a thing in virtue of that thing standing in some relations to other things. For example, the property of *being admired* is a relational property of Socrates, which he has in virtue of the relational fact that Plato admires Socrates. In this version, then, the Relational Theory claims that an allegedly intrinsic property like *being green* is really a relational property had by green things in virtue of a certain relation (the *green-at* relation) holding between them and the times at which they are green. About relations this version of the theory says that an apparently two-place relation like *being two miles apart* really is a two-place relation, but one which holds between any two things *x* and *y* at any time *t* in virtue of *x*, *y* and *t* standing in a corresponding three place-relation (a three-place relation of *being two miles apart at*). In general, this version says, an apparently *n*-adic relation is really *n*-adic, but it holds between its *relata* in virtue of an *n*+1-adic relation between those *relata* and the time at which they are so related. I shall call this version of the Relational Theory, which as far as I know has passed unnoticed, the *relational property version*.

Finally, there is a third version of the Relational Theory which, as Lewis would say (1999, p. 188, footnote 1) puts the relationality not in the properties themselves but in the having of them. I shall call this version of the Relational Theory the *instantiation version*. The instantiation version comes in three different variants. According to the first variant, which Lewis (1999, p. 188, footnote 1) calls *adverbial*, for *a* to have an intrinsic property **F** at *t* is really for a three-place relation of *instantiation* to hold between *a*, **F** and *t*. In the case of relations this variant must hold that for *a* to stand in a *n*-adic

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[3] The version I shall have primarily in mind is the canonical version, although I shall refer occasionally to the other versions. I introduce the other versions for the sake of comprehensiveness and to show that my argument against the Relational Theory is general and applies to all the versions I know.

relation **R** to $x_1,\ldots,x_{n-1}$ at t is really for a n+2-adic relation of instantiation to hold between a, $x_1,\ldots,x_{n-1}$, **R** and t.[4] The two other variants of the instantiation version are introduced and defended by van Inwagen (1990, p. 247). One of these variants has it that for a to have an intrinsic property **F** at t is really for a to bear the relation of *instantiation* to the time-indexed property **F-at-*t***. In the case of relations this variant must hold that for a to stand in an n-adic relation **R** to $x_1,\ldots,x_{n-1}$ at t is really for the relation of instantiation to hold between a, $x_1,\ldots,x_{n-1}$ and *the time-indexed relation* **R-at-*t***. The second variant distinguished by van Inwagen has it that for a to have an intrinsic property **F** at t is really for a to bear the time-indexed relation of *instantiating-at-t* to **F**. In the case of relations this variant must hold that for a to stand in an n-adic relation **R** to $x_1,\ldots,x_{n-1}$ at t is really for the time-indexed relation of *instantiating-at-t* to hold between a, $x_1,\ldots,x_{n-1}$ and **R**.[5]

In the next four sections I shall show why various arguments against the Relational Theory fail. In the last section I shall produce a new argument which shows that the Relational Theory, in all of its versions, fails to account for change, including relational change.

III

The simplest argument against the Relational Theory is Lewis' (1986, p. 204; 1999, p. 188), who just takes the position to be untenable because it denies that there any temporary intrinsics. He says that shapes are properties, not relations, and that we know that this is so. Hinchliff (1996, pp. 121-22) and Merricks (1994, p. 168) adhere to Lewis' view, and reject the Relational Theory because it conflicts with our intuition that shapes, for instance, are not relations.

Notice that this affects only the canonical version of the Relational Theory, for according to both the relational property and the instantiation versions colours, temperatures and shapes still count as *properties*, not relations. Lewis (1999, p. 188 footnote 1) is aware that his complaint does not touch

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[4] Haslanger (1989, pp. 120, 122-23) says she advocates a version of what Lewis calls the adverbial version but she herself makes clear that what she defends is hardly a version of the Relational Theory at all.

[5] Mellor and van Inwagen describe their versions of the Relational Theory only with respect to properties, not relations. Similarly Lewis describes (but does not defend) the first variant of the instantiation version only with respect to what it says about properties. This might be another feature of the generalised neglect of relational change. I have extended the versions of the Relational Theory to cover relations as well.

the first variant of the instantiation version, but he insists that it still amounts to a denial that things have temporary intrinsics. The same must be true of the relational property version and the other two variants of the instantiation version for Lewis' rejection of the Relational Theory to be solid.

But Lewis' argument is hardly an argument at all. Indeed, do we *know* that allegedly intrinsic properties are not really relations to times? What we have is, at most, an intuition, in the sense of a pre-theoretical and uncritical belief, that they are not relations to times. But then I echo Forbes' remark that he does not see 'how we could be confident that shape is not a relation to a time if we are unsure whether proximity is two-place or three-place'(1987, p. 140, footnote 3).

Furthermore, the counterintuitiveness of the Relational Theory need not be a defect since strict adherence to our intuitions would make the progress of knowledge impossible. My point is simply that being counterintuitive is not enough to reject a theory, especially in the case in question, since all theories about change are counterintuitive to some degree or other. To put it in an *ad hominem* way: our intuition that shapes, colours and temperatures are not relations is neither stronger nor more credible than our intuition that things like people, bananas and kettles do not have temporal parts, which is what Lewis believes (1986, p. 204). Thus Lewis has produced no reasons to reject the Relational Theory – at best he has shown that it is counterintuitive.

IV

Another argument against the relational view is advanced by Johnston (1987, pp. 113, 128). Exact duplicates are things sharing all their intrinsic properties, and duplicates existing at different times are as much duplicates as duplicates existing at the same time. But then, Johnston thinks, having a changeable intrinsic property cannot really be bearing a relation to a time – otherwise 'duplicates existing at different times would have different intrinsics' (1987, p. 113), which contradicts the original characterisation of exact duplicates.

This is anything but conclusive. For the relational theorist might just accept that, under Johnston's definition, no exact duplicates could exist at different times. This, of course, does not mean that things bearing exactly the same relations to different times do not look exactly the same.

A further complaint of Johnston's is that the Relational Theory requires things to change their properties continuously, even if they suffer no apparent qualitative change (1987, p. 113). A simpler way to put this point is to say that the Relational Theory makes things change continuously. But this is

just confusion. For change is having incompatible properties or relations at different times. Consider the canonical version of the Relational Theory: according to it a banana might well bear the *green-at* relation to two consecutive times *t* and *t′*. If so, the banana bears the *same* relation to different consecutive times and so it has not changed since, of course, the *green-at* relation is not incompatible with itself. There is nothing in the Relational Theory that requires things to bear incompatible relations to consecutive times.

V

Another argument against the Relational Theory is Hawley's, which implicitly assumes that a certain distinction between internal and external relations is exhaustive. Thus she first argues that changeable properties cannot be *internal* relations and then she argues that taking them to be *external* relations makes them mysterious entities and so, she thinks, the temporal parts theory should be preferred over the Relational Theory (Hawley 1998, p. 213).

The distinction between internal and external relations can be drawn in several different, but related, ways. For Hawley internal relations are those which supervene upon the intrinsic nature of the *relata*. By this she means, I take it, that if **R** is an internal relation which *a* bears to *b*, then necessarily every two things *x* and *y* with the intrinsic natures of *a* and *b* respectively are such that *x* bears **R** to *y*. Provided temperatures are intrinsic properties the relation of *being hotter than* is an internal relation in this sense.

Could changeable properties be internal relations that things bear to times? Hawley thinks not, for two different reasons (1998, p. 214). Basically her argument is that if changeable properties are taken to be internal relations to times then one is committed not only to absolute time but also to the strange theory that times have intrinsic properties. On the other hand, if changeable properties of things are internal relations to times, then things have very few intrinsic properties and it is difficult to see how the great number of a thing's changeable properties can be accounted for in terms of those few non-changeable intrinsic properties.

At this point, I think, someone could invoke a different notion of internal relations, according to which entities having no intrinsic properties can enter into internal relations provided these supervene upon the intrinsic properties of the other *relatum*. But this will not help the Relational Theory. For although this will be compatible with times having no intrinsic properties, we shall still

have the problem of how to account for the many changeable properties of things in terms of a few non-changeable intrinsic properties. Perhaps then we could resort to a notion of internal relations according to which they are those which supervene upon the identity of the terms? This will be of no help, for it has the awkward consequence that for all changeable properties **F**, if a thing has **F** at *t* then it is essential for that thing to have **F** at *t*.

Thus I agree with Hawley that changeable properties cannot be internal relations to times. Can they be external relations? Hawley (1998, p. 215), again, thinks not. For her external relations are those determined by or supervenient upon the intrinsic properties of the fusion of the *relata* (Hawley 1998, p. 215). As Hawley (1998, p. 215) says '[i]f the distance between an object's parts is one of its intrinsic properties, then spatial separation is an external relation'.[6]

Thus, supposing that there is a thing which is the fusion of the banana and the time *t* at which it is green, what intrinsic property of that fusion could determine the external relation of being *green-at* which the banana bears to *t*? In other words, what external relations hold between the banana and *t*? One might think that the answer to these questions just is: the spatio-temporal separation of the banana and *t*. But this, Hawley says, will not do, for such a separation is a temporary or changeable property of the banana-*t* fusion, 'since the banana gets closer to *t*, then further away, as time passes' (Hawley 1998, p. 215). Hawley concludes that the intrinsic properties of things-time fusions which determine the changeable properties of things must be special, permanent, non-spatio-temporal and non-causal properties of the said fusions. What these properties are nobody knows. They are mysterious properties. But then, since changeable properties cannot be internal relations and taking them to be external relations makes them mysterious entities, Hawley concludes, the Relational Theory should be rejected (1998, pp. 215-16).

Hawley's argument, if it worked, would devastate the Relational Theory, for although the relational property and the instantiation versions of it do not make properties relations they make those properties, or the having of those properties, depend on relations which seem neither internal nor external in Hawley's sense.

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[6] Why does Hawley say '*If* the distance…'? She tells me that she does not doubt it, but she was trying to be careful. In any case, if the distance between the parts of a thing is not an intrinsic part of it then the conclusion to draw is not that distance is not an external relation, but that Hawley's proposed

But Hawley's argument does not work. The problem with Hawley's argument is that her distinction between internal and external relations is not exhaustive. Internal relations are those which are determined by the intrinsic properties of the *relata*, while external ones are those determined by the intrinsic properties of the fusions of the *relata*. This leaves room for relations which are determined by no intrinsic properties of anything. Couldn't changeable properties be of this kind? Unless Hawley can give an argument to support a negative answer to this question she has not undermined the Relational Theory.[7]

VI

In his *Real Time II* (1998) Mellor argues against the Relational Theory adopted in his *Real Time* (1981). Why does he now reject the Relational Theory? Take the example of the banana again. He says that if the banana is green at *t* then the banana and *t* are co-located in time. But, Mellor says, relations do not entail, in general, that their *relata* share temporal location. Thus, Mellor concludes, changeable properties are not relations between things and times (Mellor 1998, pp. 93-94).

This, however, is not strictly true. Indeed the instantiation relations posited by the instantiation versions do seem to entail temporal location among their *relata* and so Mellor's argument does not work against all versions of the Relational Theory. But let us see whether Mellor's argument can rule out the other versions of the Relational Theory. Is it then true that relations (other than the instantiation relations of the instantiation versions of the Relational Theory) do not entail that their *relata* share temporal location? Mellor (1998, p. 94) is aware that there are some exceptions and he cites simultaneity. This, as he suggests, is a rather trivial example. Thus it is important to note that the phenomenon is a more extended one and there are many other relations which cannot hold unless their

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definition of external relations should be abandoned, for, as Hawley would admit, spatial distance is a sort of paradigm of external relation.

[7] There is also a problem with Hawley's definition of external relations, since it presupposes a fairly generous view about composition. Indeed it seems to presuppose that mereological composition is unrestricted and that for every two things *x* and *y* there is a third, namely *x*+*y*. Perhaps she does not need such a strong thesis, but for her arguments to go through she at least needs the still strong thesis that for every two things *x* and *y* which can stand in an external relation to each other there is a third entity, i.e. *x*+*y*. And why must anyone admitting external relations be committed to *any* view on composition?

relata share temporal location: *being in contact with*, *living in*, *working with*, *being married to* are some examples. So why could not all changeable properties be like these?

Mellor says that what makes the fact that the banana is green at *t* entail that the banana is located at *t* is that *being green* is a non-relational or intrinsic property of the banana which requires the banana to be located whenever and wherever the banana is green (1998, p. 94). That is, for Mellor changeable properties are not relations because they are intrinsic properties.

Why does Mellor think changeable properties are intrinsic properties? Because he requires that real changes of properties have effects, 'and for them to be changes in the things to which we ascribe those properties, that is where their first effects must be' (1998, p. 88). This causal test of change provides two related tests for changeable properties, which Mellor thinks rule out relational properties as changeable properties. The first is a causal test for properties according to which real changeable properties are those whose changes have their first effects on or near the things we ascribe them to. So, for instance, since the first effects of a change in Lenin's fame are on or near those whose thinking of him makes him famous, Lenin's fame is not a property of his. Mellor then extends his case for saying that *being famous*, *being taller than Jeff* and *being an only child* are not real properties to *relational properties in general* not being real properties (1998, p. 88).

But is he justified in this generalisation? Consider the relational property of *being in contact with b*. If at *t a*, which is cold, is in contact with *b*, which is hot, then their being separated at *t′* is a change which has effects on the thing to which we ascribe the property of *being in contact with b*, namely *a*, since it, or part of it, will suffer a change of temperature as a consequence of its separation from *b*.

Consider Mellor's second test for changeable properties. This is that a thing's properties should be detectable just by inspecting that thing (Mellor 1998, p. 88). This also prevents *being famous*, *being taller than Jeff* and *being an only child* being properties of the things they are ascribed to. But again this test does not rule out all relational properties: *having been murdered*, for instance, is a relational property detectable by inspecting the person it is ascribed to. Otherwise forensic experts could not determine whether they are in the presence of a murder, a suicide or an accidental death unless they have seen how the death occurred.

In conclusion, Mellor's general claim that relational properties are not real properties of the things they are ascribed to is unjustified. For all Mellor has shown, there are some relational properties

which are real changeable properties. Thus Mellor has not shown that changeable properties must be intrinsic properties and so he has not shown that they are not relational properties or relations to times. And, of course, *being green* and *being yellow* pass both of Mellor's tests for changeable properties. If the banana changes from green to yellow then the first effects of this are in the banana itself and, of course, the colour of the banana is detectable by inspecting the banana. So even if *being green* and *being yellow* are properties, they may be relational ones, in which case Mellor has not shown that the banana is not green at t and yellow at t' by bearing the *green-at* relation to t and the *yellow-at* relation to t'.

VII

If the previously examined arguments against the Relational Theory fail, why do I still maintain that this theory is false? The reason is simple: change is having *incompatible* properties or relations at different times, but in the Relational Theory's picture of change this incompatibility disappears. Thus change is not what the Relational Theory says it is. In other words, if the Relational Theory is true then there is no change, for then nothing has incompatible properties or relations at different times. This eliminativist feature makes the Relational Theory untenable, since its purpose was precisely to account for change, not to deny it.

Why does the Relational Theory fail to account for the incompatibility required by change? The reason is that the Relational Theory makes all change relational change, and for there to be relational change a thing must bear incompatible relations to the *same* entity at different times, but the Relational Theory fails to provide such a single entity, since on that theory incompatible relations like *green-at* and *yellow-at* are borne to *different* entities, namely *different* times.

Consider again what the canonical version of the Relational Theory says about the banana. The banana bears the *green-at* relation to t and the *yellow-at* relation to t'. Since *green-at* and *yellow-at* are relations their incompatibility means that nothing can bear both of them to the *same* entity (at the same time). *Liking* and *disliking* are incompatible relations because nothing can bear those relations to the same entity at the same time, though of course there is no incompatibility in liking Tom and disliking Tim. Indeed that Mike likes Tom at t and dislikes Tim at t' constitutes no change for Mike. For Mike might both like Tom and dislike Tim at the same time t. Mike would change if, for example, after liking Tom at t he came to dislike Tom at t'. For liking Tom is incompatible with disliking him.

Thus for the banana to change it should pass from bearing the *green-at* relation to *t* to bearing the *yellow-at* relation to *t*. But that of course never happens. And of course this is not what we get in the canonical version of the Relational Theory; instead according to this version the banana bears incompatible relations to *different* times, the *green-at* relation to *t* and the *yellow-at* relation to *t′*. But this is no more change for the banana than for someone to like Tom at *t* and dislike Tim at *t′*. After all, someone can like Tom and dislike Tim at the same time. Thus bearing the *green-at* relation to *t* and the *yellow-at* relation to *t′* is no change since the banana bears those relations to different times. Indeed, since those relations are borne to different times, they can and are borne at the same times: both at *t* and *t′*, for instance, the banana bears the *green-at* relation to *t* and the *yellow-at* relation to *t′*. Thus the canonical version of the Relational Theory does not account for change of allegedly intrinsic properties.

For similar reasons the canonical version cannot account for relational change either. For it has it that the change of *a* and *b* from being two miles apart at *t* to their being one mile apart at *t′* consists in a three-place relation of *being two miles apart* holding between *a*, *b* and *t* at *t* and a three-place relation of *being one mile apart* holding between *a*, *b* and *t′* at *t′*. But this is no change, since these relations can hold at the same time; indeed there is no more incompatibility here than in *a* and *b* being south of *c* and *a* and *b* being north of *d*.

It has been suggested to me that the relational theorist could reinterpret the notion of relational change so as to allow for change when incompatible relations are borne to different entities, provided these are *times*. Thus on this account bearing the *green-at* relation to *t* and the *yellow-at* relation to *t′* would count as a change. But this is clearly an *ad hoc* manoeuvre whose true effect is to remove all credibility from the Relational Theory. For why should times be such special *relata* that, unlike other *relata*, they need not remain fixed for there to be relational change? If all change is relational change, as the Relational Theory has it, how can a thing undergo relational change by bearing an incompatible relation to a *different* entity, even if this is a time? There appear to be no convincing answers to these questions. Perhaps the way to make more plausible the *ad hoc* manoeuvre here discussed would be to argue that times are really not *relata* of *green-at*, *yellow-at* and the like, and that these are really not relations. But then nothing remains of the Relational Theory.

Thus the canonical version fails to account for change, both intrinsic and relational. But perhaps the other versions of the Relational Theory are immune to this objection? The account of

change given by the relational property version is exactly the same as that of the canonical version, since they only differ in that for the canonical version something like *being green* is a relation to a time while for the relational property version it is a relational property had in virtue of a relation to a time. Thus the relational property version also says that for the banana to pass from being green at *t* to being yellow at *t′* is for the banana to bear the being *green-at* relation to *t* and to bear the *yellow-at* relation to *t′*. Similarly it says that for *a* and *b* to pass from being two miles apart at *t* to being one mile apart at *t′* is for them to stand in the three-place relation of *being two miles apart* with *t* and in the three-place relation of *being one mile apart* with *t′*. But this, as we saw, is no change and so the relational property version also fails to give a correct account of change, both intrinsic and relational.

Let me now consider the instantiation version in its three variants. According to the first variant for the banana to pass from being green at *t* to being yellow at *t′* is for the three-place *instantiation* relation to hold between the banana, the property of *being green* and *t* at *t* and the three-place *instantiation* relation to hold between the banana, the property of *being yellow* and *t′* at *t′*. But there is no change here, since these relations can both hold at the same time; what cannot hold at the same time are the three-place *instantiation* relation between the banana, *being green* and *t* and the three-place *instantiation* relation between the banana, *being yellow* and *t*. *Mutatis mutandis* in the case of relations. Thus the first variant of the instantiation relation fails in its account of change, both intrinsic and relational.

Similarly for the other two variants of the instantiation version. Bearing the relation of *instantiation* to the time-indexed property *green-at-t* is not incompatible with bearing the relation of *instantiation* to the property *yellow-at-t′*. The incompatibility is, of course, between instantiating *green-at-t* and instantiating *yellow-at-t*. Similarly, bearing the *instantiating-at-t* relation to the property of *being green* is not incompatible with bearing the *instantiating-at-t′* relation to the property of *being yellow*. The incompatibility is, again, between instantiating-at-t the property of *being green* and instantiating-at-t the property of *being yellow*. *Mutatis mutandis* for relations in both cases.

In conclusion the Relational Theory fails to account for change, both intrinsic and relational; for change is having incompatibles properties at different times or bearing incompatible relations, like *green-at* and *yellow-at*, *to the same entities* at different times. But on the Relational Theory incompatible relations like *green-at* and *yellow-at*, or *hot-at* and *cold-at* etc., are borne to *different*

entities, namely times. This is the simple reason why the Relational Theory fails to solve the problem of change.[8]

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