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1. Tensed Quantifiers

David Lewis

Some of our idioms of quantification embed verbs, e.g 'there is', 'there exists'. When they do, those verbs can be tensed, forming what I shall call *tensed quantifiers*. There are past-tensed quantifiers, e.g. 'there was', 'there has been', 'there existed'. There are future-tensed quantifiers, e.g. 'there will be', 'there is going to exist'. There are tensed quantifiers with compound tenses, 'there had existed', or 'there will have been'. And sometimes, at least, the unmarked quantifier phrase 'there is' or 'there exists' acts as a present-tensed quantifier.

Some of us are *four-dimensionalists*. We think that things are spread out through time just as they are through space. Our most inclusive domain of quantification—disregarding, for now, 'abstract' entities and unactualized possibilia—consists of past, present, and future things. We four-dimensionalists have a ready-made way to understand tensed quantifiers: the tenses mark restrictions of the quantifiers to subdomains of that most inclusive domain. They impose a restriction, perhaps, to past things; or to future things; or to present things; or to things that are past from some contextually definite point in the past. Or they may impose a restriction to things that will at some future time be past—which is no restriction at all.[1]

(All four-dimensionalists agree that the unmarked idioms of quantification sometimes are present-tensed, and carry a restriction to present things. Some four-dimensionalists think, rightly in my view, that sometimes instead the unmarked idioms carry no restriction. They may be used to quantify over the entire domain of past, present, and future things. But other four-dimensionalists may insist that the unmarked quantifiers invariably carry a restriction to present things, so

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[1] Except in certain structures of two-way branching time.

that if we want to quantify unrestrictedly over all things throughout time, we must resort to circumlocution. Either we can express an unrestricted quantification disjunctively; 'there are, were, or will be'; or else we can express it by means of a compound tense; 'there will have been'.[2] But this disagreement among four-dimensionalists is no kind of disagreement about metaphysics or logic—only a disagreement about English usage.)

Others are not four-dimensionalists but *presentists*. Presentists think that our most inclusive domain of quantification (still disregarding abstracta and possibilia) is just the domain of present things. Past and future things are unreal.[3] There is therefore no question of restricting the most inclusive domain so as to quantify over past or future things. There is likewise no question of shifting the domain of quantification from the domain of present things to a different domain of past things, or a domain of future things. There are no such domains to shift to. For the presentist, the unmarked quantifier is a present-tensed quantifier, just because the unmarked quantifier is an unrestricted quantifier, and quantification over present things is as unrestricted as you can ever get.

The presentist is likely to think that a past- or future-tensed quantifier is an unmarked quantifier within the scope of a tense operator. 'There has been . . . ' means 'it has been that (there is . . .)'. 'There will be . . . ' means 'It will be that (there is . . .)'. A tense operator, in turn, is a sentential modifier that works not by restricting domains of quantification (and not truth-functionally) but in some different way.

Modal irrealists will say that there is ample precedent for non-restricting sentential modifiers. For instance: 'possibly' and 'necessarily'; or 'if it were that so-and-so'; or 'according to such-and-such story'. It is harder for a modal realist to find a precedent for a non-restricting sentential modifier. But here's a precedent that even I can accept: the initial modifier in the sentence 'According to Graham Priest, some sets are and are not self-members.' So I agree with the presentists that there can be such a thing as a non-restricting (and non-truth-functional) sentential modifier.

[2] 'There were going to be' would do instead, provided we could avoid taking it as an allusion to perhaps-unfulfilled plans.

[3] For a forthright presentist manifesto, see A. N. Prior, 'The Notion of the Present', *Studium Generale*, 23 (1970): 245–8.

Set aside the deadlocked dispute over the plausibility of presentism, and ask simply how well it works on its own terms. So long as our tensed quantifiers are singular, it works fairly smoothly.[4] The presentist does as well as the four-dimensionalist in explaining the truth of 'There has been a king[5] named John', and in explaining the possible truth of 'There will be a king named Wilbur.'

But what if our tensed quantifiers are plural? Start with the simplest case: numerical quantification with a specified finite number. 'There have been two kings named Charles' or 'There will have been three kings named Charles.' (Let's insert a tacit 'at least'. If we can handle 'at least *n*' for all *n*, we can of course define 'at most *n*' and 'exactly *n*'.) The straightforward presentist translation of the tensed quantifier isn't right. There have been two kings named Charles, but not both at the same time. So 'It has been that (there are two kings named Charles)' is false.

What's to do? In general, we can build a numerical quantifier out of two or more singular quantifiers: 'There are two books here' means 'There is a book here, and there is another book here.' So we might try to build our tensed numerical quantifier out of two singular tensed quantifiers: 'There has been a king named Charles, and there has been another king named Charles.' Or, in long-winded regimentation to make explicit that each tensed singular quantifier is a quantifier within the scope of a tense operator: 'It has been that (there is a king named Charles); and it has been that (there is another king named Charles).'

That translation is all very well by four-dimensionalist lights, but I don't think a presentist has any right to it. The word 'another' seems to mean that a king Charles in the domain of quantification introduced by the first 'there has been' is different from a king Charles in the domain introduced by the second. But the presentist insists that the tense operators neither restrict nor shift domains of quantification. These kings, whether the same or whether different, are by presentist lights unreal. So what sense can it make to speak of whether they are the same or different?

However, a presentist can allow tense operators to modify not only sentences but verb phrases, giving us the modified-having by real,

[4] Not perfectly. Allen Hazen points out that a sentence like 'Never have all the kings of England been alive simultaneously' poses difficulties similar to those raised by tensed plural quantifiers.

[5] Of England. Let this be understood henceforth.

present things of properties they don't really (that is, presently) have, but that they have had or that they will have. (Analogously, using our precedent for a non-restricting modifier, we might say that the real person Russell had-according-to-Graham-Priest the property of failing to follow where argument led.) Allowing tense operators to function adverbially licenses us to quantify into the scope of tense operators, though not to quantify from the scope of one tense operator into the scope of another. If so, it is well formed (though not yet true) to say 'There is a king named Charles, and it has been that (there is another king named Charles).' But what we can say, we can say within the scope of a tense operator. So we have this nested translation, which I believe conforms to presentist strictures: 'There have been two kings named Charles' means 'It has been that (there is a king named Charles and it has been that [there is another king named Charles]).'

A similar translation is available for 'There have been three kings named Charles' in which the tense operators are nested three deep: 'It has been that (there is a king named Charles and [it has been that (there is another king named Charles and [it has been that (there is yet another king named Charles, different from both of these)])]).' And so on for larger finite numbers. To translate 'There will have been three kings named Charles' we could simply prefix 'It will be that . . . ' to the translation above; or else we could nest the compound tense operator 'It will be that (it has been that . . .)' three deep.

It's a bit of good luck that kings persist through time, and that there are never two simultaneous ones. Else to say that there have been two kings named Charles, we'd require an extra disjunct to cover the case where there have been two, and they were instantaneous and simultaneous. A general translation of 'There have been two so-and-sos' should be: 'It has been that (there is a so-and-so, and either [there is another so-and-so or it has been that (there is another so-and-so)]).' Exercise: write out the translation of 'there have been seventeen so-and-sos', presupposing nothing about which if any of the seventeen are instantaneous and which if any of them are simultaneous.

Not all numbers are finite. If the hypothesis of two-way eternal recurrence is true, there have been infinitely many kings named John, and there will be infinitely many more of them. The four-dimensionalist says that, restricting his domain to past things, or restricting it instead to future things, there are infinitely many kings named John in the restricted domain. The presentist, if he sticks to the brute-force

method we've been considering so far, requires a construction with tense operators nested *ad infinitum*.[6]

Further, some plural quantifiers do not specify a number, and some specify a number only vaguely. There have been some kings named George, and indeed there have been several of them; though never has it been the case that there are several kings named George. Once the presentist can translate tensed numerical quantifiers, he can give us a disjunction of these translations: 'There have been one or there have been two or . . . or there have been infinitely many.'[7] And in the case of the vague 'several', perhaps he can somehow leave it undecided just which disjuncts are and which are not included in his translation.

The presentist is accustomed to boast that his metaphysics of time is the view of the common man, uncorrupted by philosophy. The unsuspected complexities that we've just been exploring should therefore come as very bad news. I think the presentist might do better to abandon this brute-force method of translation, and seek some other way to handle tensed numerical or plural quantifiers. I have two alternative suggestions to offer him.

He might take to heart the lesson that nonexistent objects can cast existent shadows. Terence Parsons used this strategy to good effect in investigating Meinongian quantification: the nonexistent golden mountain has as its shadow the existent property-bundle of goldenness and mountainhood. Even the round square casts a shadow: the bundle of roundness and squareness, uninstantiable but nevertheless existent. Parsons imagines a bogus Meinong who quantifies over property-bundles, but expresses himself in such a way that he seems to be quantifying over nonexistent objects. Bogus Meinong parallels real Meinong closely enough that if real Meinong somehow fell into contradiction, bogus Meinong would too. Yet bogus Meinong offers us

[6] In the infinite case, it matters whether we translate 'There will have been infinitely many . . . ' by prefixing 'It will be that' to a translation of 'There have been infinitely many . . . ', or whether instead we give an infinite nesting of 'it will be that (it has been that . . .)' operators. If there is a first sunrise, and every sunrise forevermore is followed by another (and time isn't circular), will there have been infinitely many sunrises? Some of those I have asked, but not all, say yes. The second translation endorses their opinion, the first does not.

[7] I'd like to insist that he should cover the case where for all we know there may be proper-class many; see Daniel Nolan, 'Recombination Unbound', *Philosophical Studies*, 84 (1996): 239–62. Then I ask just how long it is possible for an infinitary construction to get. But I shall be merciful and not press the point.

nothing more peculiar than a presumably-consistent theory of property-bundles.[8]

Likewise a presentist might hold that nonexistent past and future things have existent surrogates, and that we are free to quantify, with or without restrictions, over the domain of these surrogates. There have been two kings named Charles because there are two surrogates for past kings named Charles. Under the hypothesis of eternal recurrence there would have been infinitely many kings named John because there would be infinitely many surrogates for past kings named John. There have been several kings named George because there are several surrogates for past kings named George. This presentist account, call it *surrogate four-dimensionalism*, closely imitates genuine four-dimensionalism. It works just as smoothly. Except for the need to keep inserting the words 'surrogates for', it can be just as simple. One way to keep it simple is to suppose that present, existing things have surrogates too. That way, we can speak uniformly of surrogates, even when we happen to be quantifying over present things that need no surrogates. If we didn't pursue uniformity in this way, 'There will be a king named Charles' would have to be disjunctive: 'Either there is a surrogate for a future king named Charles, or else some real, presently existing thing will be a king named Charles.'

Bogus Meinong's surrogates for nonexistent objects were property-bundles: set-theoretical constructions out of actually existing properties. Whether or not that is a safe policy for bogus Meinong—myself, I doubt that it is—it is not a safe policy for the surrogate four-dimensionalist. The only properties available as building materials for surrogates are properties that presently exist. Either our surrogate four-dimensionalist must commit himself to a dubious platonism which says that properties exist regardless of whether they are instantiated; or else he must assume that presently instantiated properties will suffice to construct all the requisite surrogates for past and future entities. It may be that long ago, when the cosmos was young and its symmetries were still unbroken, fundamental properties were instantiated that have never occurred since. These archaic properties are needed as constituents of the bundles that serve as surrogates for long-ago things, yet they are

[8] Terence Parsons, 'A Prolegomenon to Meinongian Semantics', *Journal of Philosophy*, 71 (1974): 561–80; *Nonexistent Objects* (Yale University Press, 1980). The metaphor of non-existent objects casting existent shadows is illustrated on the cover of *Nonexistent Objects*.

not to be had.[9] Nor do I see what might replace them as constituents of surrogates. So I think the surrogate four-dimensionalist would do best not to offer any set-theoretical recipe for the construction of surrogates. He would then resemble not so much bogus Meinong as Alvin Plantinga, an actualist who invokes uninstantiated 'essences' as surrogates for possibilia.[10]

Now the surrogate four-dimensionalist owes us an account of how his surrogates differ from the things that genuine four-dimensionalists believe in and he does not. He will very likely say that whereas the genuine four-dimensionalist thinks that past and future kings are 'concrete', he believes rather that the surrogates for past and future (and present) kings are 'abstract'. (Remember, we granted that a presentist's most inclusive domain of quantification might contain abstract entities as well as present things.) What, I wonder, could he mean by 'abstract'?

When Quine calls something 'abstract', he means that it is some sort of set-theoretical construction. Well and good;[11] but we have just seen why a surrogate four-dimensionalist would be ill-advised to offer set-theoretical recipes for surrogates.

When Locke said that some of our ideas were 'abstract', and when Berkeley denied it, they were talking about a lack of specificity: the idea of a triangle which is not specifically equilateral, nor right isosceles, nor.... Well and good; but I don't think that is what our surrogate four-dimensionalist could mean. How is the surrogate for Elizabeth I any less specific than Elizabeth II is?

When Donald C. Williams called (most) tropes 'abstract', he meant that they were less than the whole of what was to be found at their space–time locations. Likewise when Nelson Goodman distinguished between concrete and abstract individuals, concreta were sums of qualia that were maximal with respect to togetherness, whereas abstract individuals were sums that had no concreta as parts. And when D. M. Armstrong says that 'thin' particulars and universals are

[9] This problem of archaic properties resembles the problem of alien properties I raised against linguistic ersatzism in *On the Plurality of Worlds* (Oxford: Blackwell, 1986), pp. 159–65.

[10] *The Nature of Necessity* (Oxford University Press, 1974), pp. 70–7.

[11] Provided that, as is often thought, sets are a distinctive kind of thing. But not if sethood is a structural status, akin to coming seventeenth. Seventeenth terms are not a distinctive kind of thing; everything is a seventeenth term of some sequences and not of others. For a structuralist view of sethood, see my 'Mathematics is Megethology' in *Papers in Philosophical Logic* (Cambridge University Press, 1998).

abstracted from 'thick' particulars, he too means that they are only part of what's there. (More or less. They are 'unmereological parts', whatever that means.) Well and good; but I don't think this is what our surrogate four-dimensionalist can mean, since the surrogate for Elizabeth I no more coexists with other things at the same location than Elizabeth II herself does.[12]

He well might mean that the surrogate has no space–time location at all. But is that really so? Surely there is *some* salient relationship between the surrogate for Elizabeth I and sixteenth-century England. Not so, says the presentist, because there is no such thing as sixteenth-century England. But at least he must grant that there is some salient relationship between the surrogate for Elizabeth I and the surrogate for sixteenth-century England. Why does that relationship not give us a perfectly good sense in which the surrogate for Elizabeth I is located? We might well be able to say why not, if we already understood how things and their surrogates, and likewise locations and their surrogates, are thought to differ. But that difference is exactly what we're trying to understand, so far without success.

Finally, our surrogate four-dimensionalist might say of surrogates, as Plantinga says of essences, that they are properties. Some of us sometimes conceive of a property as the class of all its actual and possible instances. Well and good; but this conception is unavailable to a presentist, since he denies the reality of the past and future instances. We might instead conceive of a property as a proper part of the total content of a space–time location. Well and good; but we've already seen that this conception does not apply to surrogates. Or we might think of a property as something repeatable, capable of appearing in its entirety many times over. Well and good; but surrogates are not repeatables. Under the hypothesis of eternal recurrence, there have been infinitely many kings named John. If the relevant surrogates are supposed to be things that there are infinitely many of, we need different surrogates for all the different king Johns of all the different epochs. A repeatable surrogate won't do.

Nor is it helpful to say that a surrogate is a property because it is the kind of thing that can be instantiated. What we know best about being

[12] D. C. Williams, 'On the Elements of Being', *Review of Metaphysics*, 7 (1953): 3–18 and 171–92, especially 6–7; Nelson Goodman, *The Structure of Appearance* (Harvard University Press, 1951), sec. VII.8; D. M. Armstrong, *A World of States of Affairs* (Cambridge University Press, 1997).

instantiated is that it's what properties do; the notions of property and of instantiation come as a package deal. If you told me that Kevin Sheedy, though in most respects nothing like a property, can nevertheless be instantiated (and indeed has been), I would have no idea what you might mean. Likewise if you tell me that surrogates can be instantiated, that makes sense only if you have already shown me how to think of them as properties.

Now I've run out of ideas for what it might mean to call a surrogate 'abstract', or to call it a 'property'. Absent other suggestions, the difference between our presentist's surrogate kings and the four-dimensionalist's genuine past and future kings has become ineffable. All we have is a claim that somehow, we know not how, the surrogate four-dimensionalist is entitled to have it both ways. He says in one voice that there is a domain of things spread out through time, and in another voice that there is not.

I think the presentist would do better to look elsewhere for a solution to the problem of tensed plural quantifiers. A safe refuge, I think, is to claim that he just has a primitive understanding of them. Nobody can deny that tensed plural quantifiers are part of the language that we all speak, and that we all understand. If they cannot be analysed as unmarked quantifiers within the scope of tense operators, and if they cannot be understood as quantifiers over a domain of surrogates, so be it. Analysis—who needs it?

The primitivist story could be told in two superficially different versions. I think they are just terminological variants.

Version I. To be a quantifier is to function semantically like a quantifier. There must be a domain of entities, there must be a way for members of that domain to satisfy predicate phrases, and a quantifier phrase indicates whether some, or all, or none, or two, or infinitely many, or several, or . . . things in the indicated domain satisfy a predicate. Since there are no domains of past or future things, 'tensed quantifiers' are not really quantifiers.

Version II. To be a quantifier is to function inferentially like a quantifier. Tensed quantifiers are indeed quantifiers, because they obey (appropriately tensed forms of) the usual rules of quantificational logic. However, the usual semantic story about domains and satisfaction does not apply to them.

Primitivism is unambitious; the primitivist will reply that the ambition to analyse tensed quantifiers was misguided.

Primitivism is unambitious in a second way, and I think the primitivist should find that rather more worrying. Recall our complex translations of tensed plural quantifiers in terms of nested tense operators and unmarked singular quantifiers. The primitivist does not wish to offer these translations as analyses of sentences with tensed plural quantifiers. But he must still acknowledge that they are *a priori* equivalent to sentences with tensed plural quantifiers. It would be nice if he could explain how these equivalences are known to us. But once he denies that the equivalences are analytic, I don't know what other explanation he can offer.

It may be suggested that the presentist ought to help himself not to primitive tensed quantifiers, but rather to primitive 'span' operators: tense operators of a different kind than we have so far considered. I do not know how to characterize span operators in terms acceptable to a presentist. But to a four-dimensionalist (or to a presentist who understands four-dimensionalism although he does not believe it) I can say that instead of meaning 'at some past (or future) moment', a span operator means 'at some past (or future) interval'. Things can be true not only of moments but also of intervals, so why should we not have operators that allow us to say so?

Let us translate 'There have been two kings named Charles' as 'It HAS been that (there are two kings named Charles)', where 'it HAS been' is the past-tensed span operator. By four-dimensionalist lights, this will mean that it is true of some interval in the past that there are two kings named Charles. The presentist cannot accept that explanation, but he might nevertheless accept the translation with the span operator taken as primitive. Likewise we could translate 'There will be four kings named Wilbur' as 'It WILL be that (there are four kings named Wilbur)', using a future-tensed span operator. Likewise we could translate 'There will have been three kings named Charles' as 'It will be that (it HAS been that [there are three kings named Charles])'. (The outer future tense operator need not be a span operator.)

I object that span operators are so badly behaved that nobody should claim to have a primitive understanding of them. For one thing, they create ambiguities even when prefixed to a sentence that is not itself ambiguous. 'It HAS been that (it is raining and the sun is shining)' might mean that there is some past interval throughout which rain fell from a sunny sky—a 'sun-shower'. Or instead it could mean that there

is some past interval with at least one rainy sub-interval and it least one sunny sub-interval. Likewise 'It HAS been that (there are two popes)' could mean that there is some past interval throughout which there are two popes, in which case it is true in virtue of the great schism during which there were rival popes in Avignon and Rome. Or instead it could mean that there is some past interval with two different popes in two non-overlapping subintervals, in which case it would have been true even if there had never been a schism.

For another thing, span operators can be prefixed to contradictions to make truths. 'It HAS been that (it rains and it doesn't rain)' is true, at least under one of its disambiguations—the two-subintervals disambiguation. But span operators will make different truths when prefixed to different contradictions, and sometimes will not make truths at all. Sometimes they will even make new contradictions, as in the case of 'It HAS been that (it rains nonstop and it doesn't rain nonstop)' which cannot reasonably be given a two-subintervals disambiguation. Therefore they are hyperintensional operators: the intension of a sentence formed using a span operator is not a function of the intension of the embedded sentence.

The motivating idea that we should be able to say that something is true not of a moment but of an interval suggests that we should discard the two-subintervals disambiguations. That would avoid both the ambiguity and the making of truths from contradictions. But it would also wreck the plan to use span operators to translate tensed quantifiers. If 'It HAS been that (there are two kings named Charles)' had to mean that there is a past interval throughout which there are two kings named Charles, it would be false, whereas we wanted it to be the translation of something true. If, on the other hand, we discarded the throughout-an-interval disambiguations, we would still have the problem with embedded contradictions, and we would also lose touch with our original motivating idea.

A four-dimensionalist can safely use span operators (though I don't know why he would find them worth the bother), because he has another language available to remove ambiguities and to explain why sentences with embedded contradictions may nevertheless be true. He can do as I have done, and quantify explicitly over past and future intervals and their subintervals. But a presentist who takes span operators as primitive has no such resources available to him. I conclude that

primitivism about span operators is not a satisfactory presentist solution to the problem of tensed quantifiers. Primitivism about the tensed quantifiers themselves is a better bet.

To conclude. I have offered three solutions to the problem of tensed plural quantifiers: brute-force translation, surrogate four-dimensionalism, and primitivism. I have not given decisive refutations of any one of the three. But I've argued that each one bears a burden either of implausible complexity or else of unfinished business.

Late, of Princeton University