

TRANSCENDENTAL TENSE

D. H Mellor and J. R. Lucas

II—J. R. Lucas

ABSTRACT Mellor's argument from Kant fails. The difficulties in his first Antinomy are due to topological confusions, not the tensed nature of time. Nor are McTaggart's difficulties due to the tensed nature of time. The ego-centricity of tensed discourse is an essential feature of communication between selves, each of whom refers himself as 'I', and is required for talking about time as well as experience and agency.

Arguments based on the Special Theory are misconceived. Some rest on a confused notion of 'topological simultaneity'. In the General Theory a cosmic time is defined, as also in quantum mechanics, where a natural present is defined by a unique hyperplane of collapse into *eigen*-ness.

Professor Mellor holds to a tenseless account of time, and would encourage those of us who do not, to recognise how it can make better sense of some of Kant's dark sayings, suitably re-interpreted, than Kant himself could. Kant was a projectivist, holding that temporal terms were imposed by us on the world rather than discovered by us in the world. Mellor subscribes to real time, construes tense as a perspective that we, as agents, have to adopt, but not corresponding to anything in the fabric of the universe. Some of Kant's arguments for the unreality of time have already been invalidated by a deeper understanding of the issues involved and by the development of the General Theory of Relativity, but the arguments of the First Antinomy involve a tensed theory of time, and can be parried, Mellor hopes, by showing that it is tense, not time itself, that gives rise to the contradiction.

Kant's First Antinomy can be made intelligible by topology, and was refuted by Aristotle. Besides the distinction between tensed and tenseless temporal predicates (McTaggart's *A* series and *B* series) adduced by Mellor, we need two further distinctions, the distinction between instant and interval and that between metric infinity and topological openness. Advocates of a dynamic theory of time tend to talk of a process, the passage of time, which must occupy an interval—often the 'specious present'. On this account, the adjective 'present', like 'past' and 'future', characterizes an

interval, an interval of indeterminate duration, often varying with context—‘the present week’, ‘the present government’, the ‘present century’. But under Augustinian pressure the present interval can be made to shrink and shrink and shrink until in the limit it becomes a punctiform instant, with the instantaneous present ‘now’ being the boundary between the past interval and the future interval, both distinguishing them as separate temporal regions and uniting them into a single whole of time.

If we take ‘the present’ as meaning ‘the present interval’, then the first half sentence of Kant’s Antithesis is true. The world has no beginning. But it does not follow that it is metrically infinite. For although the present interval cannot be of zero duration, there is no minimum duration required for it to be an interval in which processes can take place. Around the time of the Big Bang things happened very fast. All that can be established is that if time is constituted by a continuous process of becoming, with the present being a topologically open interval, then time, being an infinite union of open intervals, is itself open. (It does not immediately follow that it could not be closed too, but it is reasonable in the context of Kant’s argument to reckon that it could not have a boundary, a first instant.)

Tense theorists who construe ‘the present’ as referring to the present instant run into lesser problems. It might be claimed that even if only an instant was being referred to, an interval was implicit in the characterisation; after all, in the differential calculus, although we ascribe differentials at a point, we define them in terms of a sequence of intervals. In order to make the charge stick at the very beginning of time, we might amend the standard account of a differential as the limit, as dt tends to zero, of $[f(t+dt) - f(t)]/dt$, and define a fluxion more symmetrically as the limit, as dt tends to zero, of $[f(t+dt) - f(t-dt)]/2dt$. In that case the protagonists of the instantaneous present would be embarrassed by a beginning of time, as they would be, even with the standard differential, by an end of time. But the embarrassment need last long. By any reckoning the beginning and end of time are exceptional, singularities for which a special account may need to be given. It is not a serious criticism of the Dedekind cut that for the number 0 it does not divide the positive rational numbers into two classes, but is merely the lower limit of the whole class.

Equally if we took an Cantorian approach, the fact that for 0 we did not have nested intervals, but only half-nested ones would not worry us unduly, and by the same token a protagonist of the present interval could maintain that the temporality of intervals at the beginning of time was sufficiently secured by what followed them, even though, in their case, they had no antecedents.

The other half of the First Antimony was shown to be invalid by Aristotle's argument of the dichotomy. Before the runner can arrive, he must get half-way there; before the runner can get half-way there, he must get half way to being half-way there; before the runner can get half way to being half-way there, he must get half way to that position... and so on. We have an infinite series of instants, of order-type ω^* the order-type of the negative integers, which must precede any conclusion of a process. There may be practical difficulties in completing a series with ω^* of separate tasks—Wittgenstein said he would be surprised to meet someone who had just counted down from minus infinity to zero—but there is no difficulty in allowing conceptually that an infinite series of instants precedes a particular instant. Indeed, it is not only instants, of measure zero, that can precede a particular instant, but intervals, possessing non-infinitesimal temporal magnitudes as well. Hoyle's theory of continuous creation, which posited the universe having existed for always, was coherent and widely held, until the echoes of the Big Bang told empirically against it.

Kant's difficulties with time are not due to its being tensed. But Mellor commends his tenseless view on other grounds too, as avoiding McTaggart's conclusion that the flow of time entails a contradiction, and as being in accord with the Special Theory of Relativity. As a loyal Cambridge man, Mellor accepts McTaggart's argument that ascriptions of tense inevitably involve a contradiction, since events are at one time future, then present, then past, but cannot be all of future and present and past. To this the obvious retort is that these ascriptions of futurity, presentness and pastness are made at different times, so that no contradiction is involved, any more than if I was at Winchester, am at Cambridge, and shall be at Oxford. But that retort is thought to be *naive*. My writing this paper was future, is present and will be past, true: but, it is said, these complex tenses likewise involve a contradiction, in as much as each event has to have incompatible complex tenses. Once again

the same retort is made, that the incompatible ascriptions are made at different dates, so that no contradiction is generated, and once again the resolution is reconstrued in terms of yet more complex tenses, themselves said to give rise to a further contradiction. The critics of tense claim this as a victory, and that they have discovered an vicious regress in the concept of tense: but it does not look like that to their opponents, who accuse them of being needlessly muddled at each stage, and when their muddle is pointed out to them, deliberately getting further muddled about the reply. In such a stand-off it is clear that deeper issues are at stake, and that the two parties are being moved by metaphysical assumptions which we need to make explicit.

Mellor, recognising that McTaggart's argument may not convince, offers a further one based on token-reflexives (or indexicals).¹ Tenses are essentially token-reflexive. The present tense is used of events contemporary with the time of speaking, the past of events that happened before the time of speaking, and the future of events expected to take place after the time of speaking. No exclusively *non*-token-reflexive translations of tensed utterances can be given, nor can their truth conditions be expressed in exclusively non-token-reflexive terms. Rather, the truth conditions of tensed utterances are functions of the time of their utterance as well as the tenseless facts of the case. And so, Mellor concludes, tense is unreal. But it does not follow. The argument does not show that tensed language is inherently self-contradictory, only that it is token-reflexive. Further argument is needed to show that it is bad. Plato would give it. Token-reflexives were bad, for the reason that Russell's term, 'egocentric particulars', suggests: they depend on the self, when *I* speak, where *I* am situated, who *I* am. And Plato was against the self. The self was arbitrary, fickle and unreliable, making judgements based on immediate inclination rather than rational consideration. The philosopher, therefore, should disengage himself from the transitory flux of the here and now, and be a spectator of all time.²

Still, Mellor concedes a lot to tense. There are tensed propositions, whose truth-value varies with time: these tensed propositions, though not equivalent to tenseless ones, are essential

1. D.H. Mellor, *Real Time*, Cambridge, 1981, pp. 98–102.

2. *Republic* VI, 486a8.

for agents' being able to act effectively. Nevertheless, since the truth-conditions of tensed propositions can be expressed tenselessly, time itself must be tenseless too. But why? It is allowed that something is being left out as regards meaning. Why are truth-conditions all-important, and meaning of no significance? It seems that 'real' is being glossed in an extremely Platonic sense. Mellor would have the philosopher able to account for agents' being able to take timely and effective action, but not be himself an agent needing to know what o'clock it was, and whether it was time to give a lecture or attend a college meeting. Such a stance is always possible, and sometimes desirable; but not universally obligatory. It leaves out too much, and has a defective view of what it is to be a person. *Ego ergo ago*. We are not just ratiocinating observers, taking a God's-eye view from nowhere, but agents whose knowledge comes from interacting with the world. Conditions for effective agency, therefore, are conditions for acquiring knowledge, and not to be downgraded as somehow failing to be real. Moreover, tenses are not so much egocentric as *nos*-centric. I talk to you, and use the present of what is happening when *you* are listening, the past of what happened before, and the future of what will happen after *our* conversation. It is not the arbitrary choice of my selfish self, but the necessary framework of our dialogue, in which you and I communicate with each other, pool information and share rationality. Even Plato should concede reality to tense on the score of dialectical necessity.

Extreme non-token-reflexive accounts of reality are defective. A tenseless account of time is likely to be as little use as a map which does not enable us to locate on it where we are, or a list of guests at a party with no means of discovering to whom one is talking. Language needs to conjugate over tenses as it needs to conjugate over the first- and second-persons. Otherwise it has no anchor in experience, and fails to address us in our actual situation. And yet, it may be argued, we do have a third-personal language purged of token-reflexive terms: scientists affect such an impersonal language, and it clearly succeeds in communicating information. In what sense, then, is it defective? There are two answers: first, that it is parasitic on ordinary language for its meaning, and second that it depends on some token-reflexive term to secure its reference, and hence its statements being able to be

true or false. The first answer allows that a language without token-reflexives is used and understood, but claims that it is understood only because we are able to give content to terms such as 'earlier' and 'later' from our antecedent understanding of words such as 'yesterday' and 'tomorrow', 'ago' and 'soon'. Novels are read and understood, even though containing no genuine token-reflexives, but we understand what the third-personal descriptions mean because we already know from our ordinary discourse what first- and second-personal terms mean. Admittedly, it is difficult to show that people could not come to understand something unless some favoured condition were satisfied. Mathematicians can characterize space in abstract terms without any apparent reliance on spatial experience. In his book Mellor argues that time can be explicated in terms of causality, itself distinguished from spurious cases by the condition of near-contiguity. But that condition is at best a contingent one: action at a distance, whether spatial or temporal, is conceivable, and has been actually accepted as true. In any case, the concept of causality is acquired, I believe, through our being agents, so that the explication is not, ultimately, totally non-token-reflexive. Moreover, although Mellor's exegesis of the conceptual links between time and other fundamental categories is illuminating, we often draw on an antecedent concept of time in interpreting our abstract formulations. When I do old-fashioned physics, and locate events in $\mathbf{R}^3 \times \mathbf{R}$, I understand the latter not as a mere dimension, but as that pervasive condition of all experience and activity in which I formulate intentions about what I shall do in the future, carry them out in the present and remember them thereafter in the past. Take away that understanding, and it might as well be temperature that is signified by t .

Mellor denies this. He denies that anything ever looks or sounds present, as opposed to past or future. But some things look future: I duck and blink and flinch as I perceive the approaching danger, and sigh with relief when the dentist at last lays down the drill. When I listen to Beethoven's Sixth Symphony, I hear the future, the present and the past thunderstorm. Children, long before they can tell the time, learn the meaning of 'later than' from their mother's 'Not now, but when Daddy comes home'. Mellor counters that the equivalence between 'later than' and 'more future or less past' cannot define 'later than' because 'later than' can also

be applied to tensed locations. But so what? Those who adopt a tensed theory of time do not deny the value of dates and other tenseless locutions. They would agree with Mellor that tensed discourse was not independent of tenseless discourse, though richer than it. We can give an account of the future in terms of its being later than the present, just as we can give an account of an event's being later than now by use of the future tense. The fact that we can do the former constitutes no reason for claiming that the latter cannot be epistemically prior.

Arguments from meaning seldom are conclusive. The second claim, that some token-reflexive term is needed to secure reference, is more telling. Novels can be read and understood, but are not literally true. Statements purporting to be literally true need warranting, which would be impossible if there were not token-reflexives to point speaker and hearer, writer and reader, towards relevant authorities and evidence. The English phrase 'Once upon a time' with its deliberate lack of temporal reference indicates that the discourse is fictional. Indeed, effective temporal reference seems a stronger requirement than spatial or personal reference. My intuition is that time is necessarily connected in a way that space and persons are not. There is only one time, whereas there could be two disconnected spaces (as in Quinton's night-time dream world³) and there are many societies with whose members we do not interact at all. Unless I can date events I am talking about, I am only telling tall tales. And to date an event is to use a system in which we are able to locate ourselves: 1066 AD dates the battle of Hastings only because we know that now it is 1998 AD.

So token-reflexivity is not bad. But Mellor can concede this, and still maintain that it is in some sense unreal. Instead of Plato, he could appeal to the authority of the Early Church, which laid down that the mark of truth was that it was accepted *semper, ubique* and *ab omnibus*. Or, more fashionably he could claim that the methodology of physical science supported the view that the real world is invariant over time, place and person, and hence tenseless, spaceless, and impersonal. These are, indeed, important marks of reality, but not the only ones: as the argument of the previous

3. A.M. Quinton, 'Spaces and Times', *Philosophy*, 37, 1962, pp. 130–147; reprinted with corrections in R. Le Poidevin and M. MacBeath, *The Philosophy of Time*, Oxford, 1993, pp. 203–220.

paragraph shows, extreme non-token-reflexivity lacks relevance for us. It is not so much 'News from Nowhere', as the anti-Platonist gibe would have it, as not news at all, if it has no bearing on us or our concerns. Only if at some remove or other it tells us about us will it have any bearing on our concerns. Just as a solipsistically subjective account may be incommunicable, and certainly is likely to lack interest for others, so a totally non-token-reflexive, non-empirical account will equally lack interest, and perhaps communicability, for everyone. An adequate account must preserve the appearances, in order that it may appear to us significant: and once experience is recognised as relevant to reality, the near-universal experience of the passage of time must be taken into account. Even though the accounts given are often metaphorical, widely understood metaphors are not to be rubbished. We may be at a loss when someone speaks of time having gone fast to answer the question 'How many seconds a second?', but this should be spur to think more deeply rather than to dismiss the locution as meaningless.

A determined projectivist might allow all that has been argued in favour of token-reflexivity, and still contend that tensed terms were imposed by us on the world rather than discovered by us in the world. But the testimony of modern physics, properly understood, refutes that claim. Although the Special Theory of Relativity has been thought by Mellor and others to tell against a tensed theory,⁴ the arguments adduced are invalid, and in any case countered by the General Theory. More importantly, if we adopt a realist interpretation of quantum mechanics, we are naturally led to seeing tense as a fundamental feature of reality.

Several arguments have been based on the Special Theory to support a 'block' theory of the universe, and hence tenseless time as an analogue to tenseless space. Minkowski spacetime has encouraged people to think of time as the fourth dimension, on a par with the three dimension of space. But Minkowski spacetime is not a simple four-dimensional space with four dimensions: rather, it is one which has 3 + 1 dimensions with a Lorentz signature that sharply distinguishes time-like separations from space-like ones. The concept of simultaneity has caused much confusion, particularly 'topological simultaneity', which sounds

4. M. Tooley, *Time, Tense, and Causation*, Oxford, 1997.

like an equivalence relation, but is not. Putnam and Rietdijk have argued that two observers in two frames of reference moving with a uniform velocity with respect to each other will have different hyperplanes of simultaneity, and so one event will be simultaneous with another which is itself simultaneous with a third that is a causal antecedent of the first: so it will be simultaneous with an event that is absolutely earlier than it.⁵ But this is a sophism, depending on our not noticing that simultaneity in the Special Theory is, like other equivalence relations, a triadic relation, in which two things are equivalent to each other in respect of a third feature that must itself be specified—in this case the frame of reference. Simultaneity with respect to two *different* frames of reference is not an equivalence relation at all. If I was at the same school as you, and you were at the same school as James, then whether it follows that I was at the same school as James depends on which school you shared with me and which with James. If you were at the same nursery school as I was, and were at Bristol Grammar School with James, nothing follows about my having been at the same school as James.

A better argument is that an event future in one frame of reference will be past with respect to another. So whether an event is future or past depends on the choice of a frame of reference, and cannot be anything absolute. Nevertheless, that argument also fails. The hyperplanes of simultaneity for a given frame of reference do not determine what is currently going on at distant places, but only what dates should be ascribed to them in order to make electromagnetic phenomena coherent. As far as electromagnetic phenomena are concerned, we have no means of telling exactly when a distant event takes place; but for any given frame of reference, if we ascribe the same date to all events on a particular hyperplane of simultaneity, then Maxwell's equations apply neatly and yield harmonious results. So far as the Special Theory goes, simultaneity is a rather superficial and frame-dependent property, which we find useful for assigning dates to different events in

5. H. Putnam, 'Time and Physical Geometry', *Journal of Philosophy*, 64, 1967, pp. 240–247; reprinted in H. Putnam, *Mathematics, Matter and Method. Philosophical Papers*, I, Cambridge, 1979, pp. 198–205; C. W. Rietdijk, 'A Rigorous Proof of Determinism Derived from the Special Theory of Relativity', *Philosophy of Science*, 33, 1966, pp. 341–344, and 'Special Relativity and Determinism', *Philosophy of Science*, 43, 1976, pp. 598–609; John W. Lango, 'The logic of simultaneity', *Journal of Philosophy*, 66, 1969, pp. 340–350.

different places, but which is not of fundamental importance in accounting for the propagation of causal influence. The ascription of presentness, pastness, or futurity, to events outside the light cone is nominal rather than real, and has no bearing on their ontological status.⁶

Many physicists are persuaded by this argument. But it is to lay too much weight on one physical theory. At one time, perhaps, the Special Theory could claim to be the last word in physics, and its principles to have universal sway. From our vantage point its claims are best evaluated by comparison with those of the Newtonian system it supplanted. Although Newton believed in absolute space, Newtonian mechanics could not, alone and unaided, identify any frame of reference as being at rest rather than in uniform motion. But, though by itself relativistic as regards rest and uniform motion, it did not rule out there being an absolute frame of reference—if the Michelson–Morley experiment had yielded a positive result, we should have identified the rest frame of the ether as being absolutely at rest. In the same way, the Special Theory, though not itself picking out a preferred frame of reference giving a world-wide hyperplane of absolute simultaneity, does *not* rule it out either. If, *per impossibile*, telepathic communications were instantaneous, we should be able to identify a rest frame in which the velocity of light was the same in all directions and the hyperplane of simultaneity really did pick out simultaneous events; we should do this, while acknowledging the adequacy of other frames of reference for dealing with electromagnetic phenomena, just as the discovery of a rest frame for the ether would have still allowed the adequacy of uniformly moving Galilean frames for Newtonian mechanics. The Special Theory is not the last word in physics, and its Principle of Equivalence does not have to hold universally, and does not rule out any preferred hyperplane of simultaneity. In fact, other physical theories rule it in. Most cosmologists use a version of the General Theory with boundary conditions that determine a universe-wide world time. Admittedly, cosmological theories are speculative, and liable to change

6. For further discussion of these arguments, see Howard Stein, 'On Einstein–Minkowski space–time', *Journal of Philosophy*, 65, 1968, pp. 5–23; and 'A note on time and Relativity Theory', *Journal of Philosophy*, 67, 1970, pp. 289–294; see also R. Sorabji, *Necessity, Cause and Blame*, London, 1980, pp. 114–119; and R. Torretti, *Relativity and Geometry*, Oxford, 1983, pp. 249–251.

radically: but the mere fact that cosmologists at present postulate a world time is enough to discredit any argument from the Special Theory that there is something unscientific in a world-wide hyperplane of present simultaneity.

But physics goes further. It not only defeats the would-be defeaters of the tense theory, but offers positive support. Quantum mechanics, if it is to be interpreted realistically, distinguishes a probabilistic future of superimposed *eigen*-states from a definite past in which each dynamical variable is in one definite *eigen*-state, with the present being the moment at which—to change the metaphor—the indeterminate ripple of multitudinous wave-functions collapses into a single definite wave. Admittedly, many of those who think about quantum mechanics are not realists, and admittedly again, there are horrendous difficulties in the way of giving a coherent account of the collapse of the wave-function. But an obstinate realism, as well as a slight sympathy for our feline friends, precludes my envisaging any long period in which Schrödinger's cat could be half-dead and half alive, and this whether she be in a laboratory in Europe or on some planet circling Betelgeuse. There is a definite fact of the matter, there as much as here, whether or not we are dealing with a superposition of functions or one definite *eigen*-function. And hence there is a unique hyperplane advancing throughout the whole universe of collapse into *eigen*-ness.

We can understand why philosophers have been led to espouse a tenseless view of time, and also why they are wrong to do so. Tenseless discourse leaves out too much. It is difficult to see how I could acquire a specifically temporal sense of temporal order without a tensed understanding of time, any more than I could acquire a full sense of personality without some first-personal experience and agency. The austere intimations of reality allowed by Plato are too austere: we cannot, on pain of ultimate irrelevance, discount completely the evidence of human experience, and the conditions in which we are able to pool information and share rationality are ones that ought to enter into any adequate account of reality. The partial views of science, important and illuminating though they are, are only partial views, and the features they ignore do not on that account fail to exist. It is too soon to suppose that quantum mechanics is the last word in physics, or that the way it

is interpreted by me is the way it ought to be interpreted, but at least at the present time it looks as if a tensed view of time is in fact a view required not only by our ordinary untutored experience, but as a fundamental feature of the fabric of the physical universe.