

A.N. PRIOR AND THE FINITUDE OF TIME

QUENTIN SMITH

I

If time can begin or end, how are we to define its beginning and ending? According to A.N. Prior, the task of the tense-logician is to construct relevant definitions that do not presuppose any metaphysical commitments.<sup>1</sup> But has Prior eschewed all metaphysics in his constructions of these definitions?

Prior discusses the beginning and ending of time in *Past, Present and Future*, Chapter Four and *Papers on Time and Tense*, Chapter Ten. In the former work he avers that

what is meant by time's having an end is precisely that for any  $p$  either already it will never be the case that  $p$ , or it will be the case that it will never be the case that  $p$  (or to put it another way, that it either is the case, or will be the case, that nothing —not even that such-and-such *has* occurred— *will be the case* any more).<sup>2</sup>

W.H. Newton-Smith comments in agreement on this passage:

Clearly we ought to agree with Prior that it is true that time has an end if and only if it is true that there is a time at which all future tense propositions are false.<sup>3</sup>

Prior does not himself apply a definition of this type to the beginning of time, but it is not difficult to do so:

<sup>1</sup> A.N. Prior, *Past, Present and Future* (Oxford: Clarendon Press, 1967), p. 59.

<sup>2</sup> *Ibid.*, p. 75.

<sup>3</sup> W.H. Newton-Smith, *The Structure of Time* (London: Routledge & Kegan Paul, 1980), p. 56.

What is meant by time's having a beginning is precisely that for any  $p$ , either already it has never been the case that  $p$ , or it has been the case that it has never been the case that  $p$  (or to put it another way, that it either is the case, or has been the case, that nothing —not even that such-and-such *will occur*— *has been the case* before).

Newton-Smith would summarily state this as the truth that time has a beginning if and only if it is true that there is a time at which all past tense propositions are false.

My objection to these definitions of beginning and ending time is that they presuppose a metaphysical position concerning the status of propositions. Prior assumes, not a nominalism or conceptualism, but a temporalized version of 'Platonic realism'. For Plato, propositions or Form *are* eternally and nondependently upon time-bound mortals. Prior of course is not a 'realist' in this sense but in the sense of a 'realistic temporalism', a view that holds that some propositions *are* at each present time. This does not mean that propositions 'exist' in every present time after the fashion of individuals. Prior wishes to avoid the suggestion that

there are abstract entities call 'facts' and/or 'propositions' which exist as individuals do.<sup>4</sup>

Propositions for Prior may not be 'entities' that 'exist', but nevertheless they *are* at each present time. Prior asserts that for example

*There is now* such a proposition as the proposition that  $p$ .<sup>5</sup>

But let us consider a possible beginning of time. It is

<sup>4</sup> A.N. Prior, *Papers on Time and Tense* (Oxford: Clarendon Press, 1968), p. 147.

<sup>5</sup> *Ibid.*, p. 149. I have added italics to 'There is'.

conceivable that time began 15 billion years ago with the Big Bang. There is no reason whatsoever to believe that humans existed at that time; in fact, the preponderance of evidence suggests that it was physically impossible for humans to have existed then. This means that there probably were no humans then to entertain past tense propositions and to believe them false. Nevertheless, if the account by Prior (and Newton-Smith) of the beginning of time were true, then there would have been false past tense propositions 15 billion years ago, propositions that were not entertained or believed by anybody.

Now I simply cannot see how the proposition 'Time began 15 billion years ago when no humans existed' entails the proposition 'Propositions *were* nondependently upon human minds'. I believe there is no *a priori* connection between the issue of the beginning of time and that of the status of propositions. If time could have begun, it could have done so regardless of whether realism, conceptualism or nominalism is the correct theory of the status of propositions.

## II

A definition of the beginning and ending of time that foregoes all metaphysical commitments would have to be formulated in a way that does not presuppose a position on the above-discussed issue. One version of this definition omits all reference to propositions:

Time begins if:

1) Before each interval of time, there are either finitely many other intervals of the same length, or no other intervals.<sup>6</sup>

<sup>6</sup> Point (1) must be qualified so as to take into account the Milne nonstandard temporal metric, according to which the measure of temporal intervals is given by

$$I = k_0 \log (t/t_0) + t_0$$

2) There is an interval of time such that no interval of the same length is earlier than it and every interval of the same length is later than it.

3) There is a present interval such that it is no after any past interval of the same length and such that it is not itself a former future interval.

The beginning of time can be defined in relation to false past tense propositions in the following metaphysically uncommitted way:

If there is a time at which humans exist and are believing a past tense proposition  $p$  that purports to refer to an infinite past time, then at that time (at least) there is a false past tense proposition  $p$ .<sup>7</sup>

Analogous definitions can be constructed in reference to an ending of time.

where  $k$  is the standard periodic astronomical measure. Since the function is logarithmic, there are infinitely many equal intervals as measured by the  $I$  standard before some time  $t_0$  even if there are only finitely many such intervals before  $t_0$  as measured by the  $k$  standard. Accordingly, the qualification made to point (1) is that the measure of intervals must not be the nonstandard measure  $I$  but the standard measure  $k$ .

<sup>7</sup> This definition is to be construed in such a way that it permits propositions to be reductively analysed in terms of sentences.