A Brief Concluding Comment

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The dispute between Dr Rupert Read and myself[1] turns principally upon philosophical methodology, which is why it may have been interesting even to those indifferent to philosophical issues concerning time. I shall say nothing further on this score, leaving readers to decide for themselves in favour of one or other of us (or, as is usual when philosophers assess disagreements between other philosophers, to judge that both are mistaken). I confine myself to a single point that Dr Read still appears not to have understood.

What is the point of asking whether the real line is *made up of* or *composed of* individual real numbers? What is the point of asking whether time is made up of or composed of durationless instants? Such descriptions are patently metaphorical. In my first article, I tried to cash out the metaphor. Dr Read, not understanding the purport of the passage in which I did so, quoted it in his original reply to me, and criticized what I had said in it. In response to him, I indicated the intended purpose of that passage; I will here explain it more explicitly, because Dr Read does not yet seem to have understood it as I intended.

On the classical conception of the continuum, the real line is composed of individual real numbers. This means the following. A real number is not defined in terms of the real line, but as a Dedekind cut in the rational line, an equivalence class of Cauchy sequences of rationals, or the like, while the real line is explained as the totality of real numbers. Further, an open interval of the real line is explained as the set, for two real numbers a and b, where a is less than b, of all real numbers x greater than a and less than b. Similarly, a function of real numbers is explained as a function defined on all real numbers. It is not explained in terms of some other kind of function, but just by the use of the generic notion of a function, so that, in general, the value of a function for any real

[1] Michael Dummett, 'Is Time a Continuum of Instants?', *Philosophy,* 75, 2000, pp. 497–515; Rupert Read, 'Is "What is time?" a good Question to Ask?', *Philosophy,* 75, 2002, pp. 193–209; Michael Dummett, 'How should we conceive of Time?', *Philosophy,* 78, 2003, pp. 387–396; Rupert Read, 'Time to stop trying to provide an account of Time', ibid., pp. 397–408.

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number as argument is independent of its value for any other real number as argument. That is to say, the real numbers form the basic elements of the theory: everything else, including the real line as a whole, is explained in terms of them.

On the classical model of time, time is composed of durationless instants. This means that such instants are explanatorily fundamental: other temporal notions are explained in terms of them. Thus an interval of time is explained as consisting of those instants that lie between two instants as end-points. The magnitude of a variable basic quantity, say the mass of some substance, is taken as given by a function defined on durationless instants. Given an origin and a temporal unit (e.g a second), temporal instants may be represented by the real numbers; given a suitable unit for the quantity, its magnitude may be represented by a real number, a triple of real numbers or the like. Thus the function giving the magnitude of the quantity at any instant may be represented by a function on the real numbers. Accordingly, the magnitude of a basic quantity at any instant is logically independent of its magnitude at any other instant. Any dependence it may have derives from the laws of physics, and not from the model itself.

So understood, it is wholly uncontroversial that on the classical conception of the continuum, the real line is composed of individual real numbers, and that, on the classical model of time, time is composed of durationless instants. It is not anything to be argued about. It is, however, crucial to whether the classical continuum can be taken to give a faithful model of physical time.

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