

Second, in his discussion of correspondence theory, Künne spends much time investigating questions about the second *relata* of the correspondence relation, but he takes the notion of correspondence too narrowly, and he gives little consideration of the nature of the relation itself. We can conceive of a theory in which singular terms and predicates bear special causal connections (of the kind Kripke and others envisaged) to their referents and extensions (or intensions). Such a theory may well be considered a version (or even the premier version) of correspondence theory. But Künne does not even mention the possibility of such a theory. Meanwhile, most of the versions discussed in the book have little to say about the nature of the correspondence relation. What is common in the above problems is that Künne does not seem to be concerned with giving a naturalistic account of truth and semantic relations.

Finally, the modest account does not seem sustainable. Künne has a dubious interpretation of higher-order quantification, which may be indicated by the following passage. In a discussion involving an instance of (2), Künne says:

If the sentential quantifier subserves higher-order quantification over propositions, it is objectual. Hence whether  $\exists p(\text{The Pythagorean Theorem} = [p] \ \& \ p)$  expresses a truth depends on whether there is an object within the range of the variable, a proposition, that is, which satisfies the condition signified by the open sentence 'The Pythagorean Theorem =  $[p]$  &  $p$ '. A proposition meets this condition if and only if it is identical with the Pythagorean Theorem and true.

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To reveal his confusions, note that (a) is a proposition, but that (b) is not:

(a) *The proposition that* the square on the hypotenuse equals the sum of the squares on the other two sides.

(b) The square on the hypotenuse equals the sum of the squares on the other two sides.

(By '(a)' and '(b)', I am referring not to the expressions but to their denotations.) Generally, an object, say  $o$ , satisfies the condition signified by the open sentence ' $\dots x \dots$ ' (where ' $x$ ' is a variable) if and only if  $\dots o \dots$

But, contrary to Künne's foregoing claim, (a), a proposition, cannot satisfy the first occurrence of ' $p$ ' in ' $\text{The Pythagorean Theorem} = [p] \ \& \ p$ ', for [*the proposition that* the square on the hypotenuse equals the sum of the squares on the other two sides] is *not* a proposition; [the square on the hypotenuse equals the sum of the squares on the other two sides] is. (Recall that in Künne's notation,  $[p]$  itself is *the proposition that*  $p$ . So the former item would be *the proposition that the proposition that ... two sides*—this, apparently, is a non-entity. Indeed, quantifying into ' $[ ]$ ' does not seem to make sense.) (a) cannot satisfy the second occurrence of ' $p$ ' in the open sentence either, for ' $\dots \ \& \ \text{the proposition that}$  the square on the hypotenuse equals the sum of the squares on the other two sides' is ungrammatical. Since (a) ought to be the proposition that satisfies the relevant condition if any proposition does, it follows that no proposition satisfies the condition. Thus, Künne's account does not make the Pythagorean Theorem true.

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Le Poidevin, Robin, *Travels in Four Dimensions: The Enigmas of Space and Time*, Oxford: Clarendon Press, 2003, pp. xvii + 275, £14.99 (cloth); £8.99 (paper).

This book is a philosophical introduction to the classic problems and paradoxes of space and time. One of the nice things about the book is that it does not take the approach

of simply working through a catalogue of puzzles one by one: connections between different problems are brought out, and attention is focussed on the ways in which a strategy which seems promising in response to one puzzle can run into problems with other puzzles.

The book has twelve main chapters, in which the following topics are addressed: conventionalism *vs* objectivism about temporal metric (chap. 1); relationism *vs* absolutism about space and time (chaps. 2–3); Euclidean and non-Euclidean geometries and the shape of space (chap. 4); the extent of time and space (did time have a beginning and will it have an end; is there an edge to space?) (chaps. 5–6); Zeno's Achilles and Dichotomy paradoxes and the question of how finely space and time can be divided (chap.7); the problem of the passage of time, the A-series and the B-series, McTaggart's paradox of the A-series, and the debate between A-theorists (with particular attention to presentism) and B-theorists (chap. 8); Zeno's Arrow paradox and the problem of motion (chap. 9); the alterability of the past, backwards time travel, and backwards causation (chap. 10); multiple and branching times and spaces (chap. 11); and the direction of time and its relations to the asymmetries of thermodynamics, psychology, and causation (chap.12).

There are three further sections at the end of the book. The first, 'Concluding Thoughts', recapitulates the main topics covered in the earlier chapters, and makes clear the various threads and themes running through those chapters. This is an extremely useful section: much more so, in many ways, than the more usual introduction (something this book lacks). The second supplementary section describes, without further analysis, a host of further puzzles and problems about space and time. The final section gives a guide to further reading for each chapter of the book, and includes helpful descriptions of each item cited; apart from the odd surprising omission (e.g. of Benacerraf's paper 'Tasks, Super-Tasks, and the Modern Eleatics', *Journal of Philosophy* 59 (1962): 765–84, from the set of further readings for chap.7) this section is excellent.

There is one striking gap in the list of topics covered: the issue of how objects persist over time—in particular the debate between endurantists and perdurantists, and the related question of the existence of temporal parts—and the relationship between this issue and the debate between A-theorists and B-theorists. The problem of persistence is mentioned in the section 'Concluding Thoughts', but only as a topic for independent thought. A separate chapter on this material would have been useful.

Who should read this book? The book does not come with an indication of its intended audience, although Le Poidevin notes in the Preface that it arose out of a course of lectures. The book would be excellent as a general, background text for an undergraduate course in the philosophy of space and time, to be used in conjunction with a set of journal articles on specific issues. The articles would be needed because, as noted in the Preface, the book seeks primarily to present the problems of space and time, rather than advance particular solutions to them or present detailed theories arising from them. 'It is the problems themselves that stimulate independent thought, and my aim will be fulfilled if the reader is as excited about the problems as I have been and feels just as keenly the need to seek solutions to them' [xi]. The book achieves this aim brilliantly: it is engagingly written and well-paced, and has the right mix of accessibility and difficulty for a philosophy undergraduate. Each chapter comes with a list of questions for further thought, and these, together with the supplementary sections of further problems and suggested readings, are a great spur to independent thinking.

Certain comments in the Preface ('so introductory a volume', 'elementary introduction') suggest that perhaps the book is also intended for a general audience. The general reader, however, would not be as well catered for as the philosophy undergraduate: the book makes free use of philosophical machinery and distinctions, without explaining these from the ground up in the way that would be required to make the material accessible to an audience without any background in philosophy.

Despite the fact that the book is billed as an elementary introduction, the specialist reader will find material of interest here: in particular, some of the material about the relationships between presentism, A-theory, and McTaggart's paradox [chap. 8], presentism and the static and dynamic views of motion [chap. 9], and A-theory and the possibility of branching time [chap. 11]; and also some of the material about the direction and passage of time [chap. 12].

There are only two serious shortcomings in the content of the book. The most notable is the omission of any mention of analysis (i.e., the branch of mathematics) in the discussion of the paradoxes of infinity and motion. Le Poidevin writes: 'Treating these problems simply as mathematical conundrums, requiring for their solution only the technical notion of the infinitesimal, does not do justice to their philosophical interest and importance' [239]. This is doubly odd. First, the notion of the infinitesimal plays no part in the standard mathematical solution to these puzzles (the infinitesimal figures, rather, in *non-standard* analysis). Second, that solution—incorporating the theories of limits, of the continuum or real line, and of real-valued functions and the continuity, differentiation, and integration thereof—is no mere technical trick (remember, it is not simply *calculus* which is at issue here, but *analysis*): it is one of the deepest and most profound discoveries humans have made, and the light it throws on the notions of the infinite and of motion (among other things) is of the *utmost* philosophical interest and importance. Le Poidevin writes: 'We could respond to Zeno's paradoxes on two levels: we could view them simply as mathematical conundrums requiring a mathematical solution; or we could view them as raising deeper, philosophical or conceptual difficulties' [104]. But the correct view is that they are deep conceptual problems which the mathematicians have actually solved, thus making an important contribution to philosophy as well as to mathematics. Ironically, when Le Poidevin writes dismissively that Zeno's paradoxes admit of 'mathematical solution[s] which yet [do] not diminish [their] philosophical interest and significance' [115], he is exactly right: the solutions do not diminish the significance of these problems—they solve these deeply significant problems! In any case, even if one does not, for one reason or another, accept the standard mathematical solution, this solution should at least be presented—something which Le Poidevin does not do, instead focusing on responses such as atomism [119] and the view that space and time are only *potentially* infinitely divisible [106].

The other shortcoming is the treatment of time travel. First, in his search for a definition of time travel, Le Poidevin arrives at the idea that the history of the time traveller must be discontinuous in external time (i.e., the time traveller *disappears* when she leaves for the past). Unfortunately this immediately rules out what is arguably the most interesting sort of time travel: the sort which involves closed timelike curves in universes satisfying General Relativity (e.g., Gödel-type time travel). Second, the treatment of the paradoxes of time travel is rather cursory. After discussing the Grandfather Paradox and mentioning the paradox of information which comes from nowhere (e.g., the time traveller who is told as a child how to build a time machine by her time-travelling older self, who herself only knows how to time travel because she received the information as a child when she was visited by her older self), Le Poidevin presents the following case: Peter and Jane, aged 20, encounter 40 year old Peter stepping out of a time machine; he gives Jane a diary and instructs her to travel forward 20 years, making a record of her trip in the diary; on arrival she meets Peter, now aged 40, and gives him the diary, instructing him to travel back 20 years and make a record of his trip; on arrival he meets Peter and Jane, aged 20 . . . . Le Poidevin asks how many entries there are in the diary, and then says, without further comment, that there does not appear to be a consistent answer to this question [181]. But there is: either Jane does not write a record of her trip, or she does, but it is somehow erased during Peter's journey. What we have here is in fact a case which combines Grandfather Paradox issues (something will cause either Peter or Jane to fail to follow their instructions, just as something will cause a person who tries to kill her Grandfather before the conception of her parents to

fail in some way or other) with the paradox of objects with circular histories (in this case, the diary), the latter being a close relative of the paradox of information which comes from nowhere. This connection should have been brought out explicitly, rather than this final paradox being presented as a new and insoluble one.

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Lillehammer, Hallvard and Gonzalo Rodriguez-Pereyra, eds., *Real Metaphysics*, London: Routledge, 2003, pp. VIII + 248, £65 (cloth), £19.99 (paper).

This festschrift for D.H. Mellor follows the usual drill: an introduction briefly describes Mellor's life and works (so far), then grouping the essays by topic, relates each to Mellor's views on that topic; the essays themselves follow; then a reply essay by Mellor himself. The topics, according to the introduction, are 'Truth, truthmaking, and success' (containing essays by David Armstrong, David Lewis, Gideon Rosen, Peter Smith, and Chris Daly), 'Mind and Causation' (Tim Crane, Frank Jackson, Paul Noordhof, and Peter Menzies), 'Dispositions and laws' (Isaac Levi, Alexander Bird, and Arnold Kowslow), and 'Time and change' (Gonzalo Rodriguez-Pereyra and L. Nathan Oaklander). In what follows, I'll discuss some of the included papers in depth. This should not be taken as implicit criticism of the papers left out.

The topics could easily have been broken down more finely than they are: the papers by Armstrong, and Lewis are strictly on truthmaking, not truth; that by Daly strictly on truth, not truthmaking. Similarly, Crane's and Jackson's papers are unadulterated philosophy of mind, Menzies's pure metaphysics of causation. One topic that's strikingly missing is objective probability, or, in Mellor's terminology, chance—not even an index entry—though Mellor's account of chance gets some discussion in Koslow's essay.

The distinction drawn above between the topics of truth and truthmaking is no point of mere librarianship. Peter Smith's essay, 'Deflationism: the facts', points out that there seems to be a tension between Mellor's deflationary attitude to truth, and his inflationary attitude to truthmaking. The latter being his view that there are '*facta*', structured entities, like David Armstrong's states of affairs, that make atomic propositions true. It's easy to imagine that *facta* are purpose built to fit into a correspondence theory of truth. What business has a deflationist like Mellor in believing in such things?

A simple answer is that *facta* play a role in Mellor's accounts of causation, and (since *Real Time II*) of change. Since he has use for them, let him believe in them, even if that that use is remote from the uses in the theory of truth that they might seem to be built for. The tension is illusory. It's fallacious to infer from a supposed love of *facta* on the part of correspondence theorists about truth to the claim that anyone who loves *facta* is a correspondence theorist. In any case, contemporary correspondence theorists (in the style of Field's Tarski\* for example) have no more use for *facta* than deflationists. And the giants of truthmaker theory—Armstrong for example—don't plan to use their truthmakers in a theory of truth, but as something more like a criterion of ontological commitment. 'Truthmaker' is a bit of a misleading label.

Has Smith missed this point because, perhaps, in Cambridge, the *Tractatus* is regarded as the last word in both truthmaker and correspondence theory? Even in view of the simple solution to the seeming tension in Mellor's view, Smith could still present himself as offering a more robust solution: *facta* can play a role in a theory of truth, even for a deflationist. That role is via a causal account of the content of beliefs, and Mellor's view that *facta* are the *relata* of causation. *Facta* are involved in linking