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INTRODUCTORY NOTE

"Modern Perspectives on the Philosophy of Space and Time" was not the first title I had in mind when I was drawing up my list of philosophers. Rather, I was thinking along the lines of "Alternative Philosophy of Space and Time" or "New Directions in Philosophy of Space and Time". However, the former suggestion was likely to commit the authors brought together here to points of view they did (and do) not wish to be associated with. The latter seems to invite a promise for the future. No doubt some of the contributors in this volume will agree that that is what they are heading for, but some will perhaps disagree. The qualification "modern perspectives" only implies that these views have not been around before. That is surely the case. The five thematic papers in this volume are, on the one hand, largely independent of one another, on the other hand, the cautious reader will observe many similarities and relations between them. The mere fact that they are brought together here, as far as I know for the first time, makes this issue of *Philosophica* for this editor a success. All this being said, what is common to all contributions, is that they develop or pay attention to points of view that cannot be labelled either "classical", "accepted" or "standard".

Graham Priest's paper "On Time" is an application of his paraconsistent or dialetheic view of the world. Contradictions do not frighten him. In fact, by replacing classical logic — where inconsistency and triviality are mere synonyms — with paraconsistent logic (and a marvelously simple one at that) he revives the well-known idea of change as (or in) contradiction. Perhaps this is an old idea after all. Maybe it has been around for some time, but the precise formulation given to this idea by Priest certainly must be considered entirely novel. And, whatever one happens to think about accepting, under certain conditions, inconsistencies as true, it is neither trivial nor nonsensical. It might take time (!) to get used to it, but there is something deeply intriguing, to say the least, to solve Zeno's paradox of the arrow by accepting the paradox as correct. If the reader were to remain sceptical, I can only advise him or her to look at the other work of Graham Priest to see for him- or herself how well developed the paraconsistent view is.

I do not deny that I am rather enthousiastic about this approach. This — how could it be otherwise? — does not imply that it is immune of criticism (fortunately). John McKie's contribution "Transition and Contradiction" is a coherent, systematic attempt to evaluate the pros and cons of this view. Not satisfied with Priest's solution, he explores what discrete, instead of continuous, models of space and time have to offer. To my mind, the most important part of this paper is his analysis of the nature of "hodons" — the elementary, not further divisible parts of space — and "chronons" — the elementary, not further divisible parts of time. We are all familiar with the traditional questions about these entities. If a hodon has a structure, say it is a little square tile or something of the kind, then we can introduce further distinctions within the hodon: it has a border, an interior, is has angles, etc. Thus, it is not elementary. McKie shows that this need not be the end of the discussion. For all philosophers who prefer a discrete view of nature (for whatever reason), this is an important paper.

One such philosopher is the editor himself of this volume. In my paper "How Infinities Cause Problems in Classical Physical Theories", I do not directly present a discrete alternative, rather I explore what role infinities play in classical physical theories, Newtonian mechanics in particular. It is therefore not a defense of discreteness or finitude. It is not the question "What happens if infinities are eliminated from physics?", rather it is the question "What problems do I have if infinities are allowed without restrictions?". As it turns out, the consequences are quite interesting and invite philosophical reflection. If one did not know it already, infinities are tricky things. We are forced to abandon our intuitive reasonings about space and time. Of course, one might argue, so be it. However, one might just as well argue that perhaps our intuitions are not that bad after all. The strength of my arguments turns on one vital element: the unrestricted allowance of infinities must lead to the abandonment one of the most cherished ideas of (classical) physics: determinism. Hence, my conclusion is that physicists must make a choice: either you accept infinities and lose determinism, or you insist on maintaining determinism, but then something must be done about infinities. You cannot have both at once.

At this point, I am in full agreement with the reader who thinks that, so far, a lot has been said about discreteness and the like, however, what remains totally unclear, is what a discrete universe will look like. Therefore, the next paper presents one possible elaboration: Clive W. Kilmister's "Space, Time, Discreteness". For this editor, this is a rather special contribution. Clive Kilmister is a member of the ANPA (*the Alternative Natural Philosophy Association*). They are a group of philosophers, physicists, mathematicians, biologists, ... that explore alternative views of the world. Although they form a rather heterogeneous group, there is one element common to them all. Their preferred theory is the combinatorial hierarchy as developed by F. Parker-Rhodes (this explains the dedication of Kilmister's paper) and presented in his book *The Theory of Indistinguishables. A Search for Explanatory Principles Below the Level of Physics* (Kluwer Academic, Dordrecht, 1981). Much like Graham Priest's approach, it takes some time to understand the full implications of this view. This is precisely the aim of his contribution: to present in a clear, transparent fashion the basic elements of this particular theory. As a historical note, I must add that this journal bears a special relationship with the ANPA, as, now almost thirty years ago, a paper was published in this journal (then called *Studia Philosophica Gandensia*) by another of the founding members, Ted Bastin ("On the Origin of the Scale Constants of Physics", 4, 1966, pp. 77-101).

The last paper, Newton C.A. da Costa and Francisco Antonio Doria's "On the Incompleteness of Axiomatized Models for the Empirical Sciences" stands quite apart from the other contributions (although not completely, see further). The core idea of their contribution is easily expressed. When Gödel published his famous incompleteness results in 1931, at first only the philosophers were worried, but not the mathematicians and the physicists. After the negative solution of Hilbert's tenth problem concerning Diophantine equations, the mathematicians too became worried, but not the physicists. It was bound to happen: what da Costa and Doria show is that physicists too should start to worry. They show, in clear terms, that Gödel-like sentences that have a particular physical meaning — again in the framework of classical mechanics — crop up in physics. I sincerely believe that the importance of this result cannot be overestimated. Inevitably for their presentation, the authors spend most of their time on the meta-level. They are doing meta-physics — not in the usual sense of the word, but in analogy with meta-mathematics — and, in that sense, their paper is quite similar (in approach, that is, not in results) to the not so well-known (but nevertheless fundamentally important) paper of Richard Montague "Deterministic Theories" (originally published in 1962, it is reprinted in Richmond H. Thomason (ed.): *Formal Philosophy. Selected Papers of Richard Montague*, Yale University Press, New Haven/London, 1979[3], pp. 303-359). One can only hope that their work will revive interest in that part of the work of Montague.

Returning to what I said in the beginning of the last paragraph, there is indeed a connection with some of the other papers. We are all familiar with Berry's paradox. In recent times, Gregory Chaitin has rephrased this paradox in a computational fashion. (For an excellent overview of his work, see his two books *Information, Randomness and Incompleteness. Papers on Algorithmic Information Theory*, World Scientific, Londen, 1990 and *Algorithmic Information Theory*, Cambridge University Press, Cambridge, 1992). It turns out that Berry's paradox is intimately related to the concepts of complexity and randomness. Understandably, da Costa and Doria make reference to Chaitin's work. But so do some of the members of the ANPA. Especially, David McGoveran relies explicitly on these results. Although his name is missing in my contribution, I am deeply convinced that any serious treatment of discrete space and time will have to deal with Chaitin's fundamental contributions. This, at least, will be one of the fundamental open questions on the agenda of the alternative philosophy of space and time.

Finally — how could it be otherwise? — I do not claim that the five papers brought together here present a complete overview. Most importantly, quantum mechanics is almost entirely missing in this volume. This, no doubt, will prove to be the second most important problem on the afore-mentioned agenda.

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