reviews

Introducing relativity

Paul Davies

Essential Relativity: Special, General and Cosmological. Second edition. By W. Rindler. Pp. xv+284. (Springer: New York and Berlin, 1977.) DM67.70; $29.80.

AFTER eight years I still find Rindler's book one of the best introductions to the theory of relativity, and I was eager to read his second edition. The title *Essential Relativity* is an apt one, for even though this edition contains some new material, only the bare essentials of the subject are discussed. This is not a drawback, because Rindler manages somehow to get very far with very little investment in detailed calculation or protracted conceptual deliberation. In this respect it makes ideal introductory reading for students of physics, although mathematics students will not find much in the way of modern differential geometry or topology.

In the preface to the second edition the author explains how the emphasis of the book is on the conceptual foundations rather than the mathematical development of relativity theory. Proofs are kept to a minimum and many examples and mathematically-oriented discussion are only punctuated by, rather than rooted in, hard equations. Nevertheless, the reader is taken swiftly and effortlessly (maybe somewhat deceptively) through pre-Einstein ideas of space and time, basic special relativity, Minkowski space and four-vectors, tensors, particle mechanics and electrodynamics. Then we move into general relativity, which starts out with the most 'conceptual' section of the book, in which the idea of curved space-time is explained in just a few pages. The Schwarzschild metric just seems to pop out from this discussion, to be followed by an updated description of black holes and the Kuskal manifold.

When I re-read the section on uniformly accelerated observers in Minkowski space, I was disappointed to find that the author, whose name is famous for his connection with the co-ordinatisation of Minkowski space based on a collection of accelerating observers, had not chosen to expand more on this very useful construction. I have found the ideas of uniform acceleration both useful and elegant exercises for undergraduates, as well as a very profitable analogy for the more advanced discussions of black holes.

The book concludes with a section on cosmology, and once again I was interested to see if Rindler's discussion of horizons had been elaborated. The earlier edition was one of the first undergraduate textbooks of its time to try and present this subject conceptually. The new edition contains the familiar remarks about crawling bugs and rubber sheets, as well as the usual mathematical conditions for horizons, but also includes some new material and diagrams to help untangle some of the apparent paradoxes associated with them.

Although the organisation of the material is largely the same as before, many sections have been re-written, in the same lucid style. New sections on the plane gravitational wave and linearised general relativity, as well as two appendices on curvature and Maxwell theory, have been added. I was disappointed at the price for a book which should be aiming at the 'mass' student market, to which it is admirably suited. How many undergraduates will pay nearly £20 for a basic course textbook? □

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Immunological series

Comprehensive Immunology. Vol. 1: Immunology and Aging. Edited by T. Makinodan and E. Yunis. Pp. 208. Vol. 2: Biological Amplification Systems in Immunology. Edited by N. K. Day and R. A. Good. Pp. 325. (Plenum: New York and London, 1977.) $27 each volume.

THE new series *Comprehensive Immunology* is intended eventually to cover all aspects of immunology with "definitive analyses, thoughtful reviews and probing discussions". There already exist several good series on immunological subjects and the launching of another cannot be greeted with unmixed joy. These first two volumes, however, are well produced and have some valuable features. If their standard can be maintained, the series should prove useful.

The appearance of *Immunology and Aging* is timely, since no comprehensive review has been available and increasing interest is being shown in the field. It is also a good moment to look back over the large amount of data that have accumulated on ageing in relation to the immune system. We are still far from understanding this relationship, and it is certainly complex. The thymus and T lymphocytes, however, are widely believed to be among the central characters in the drama, and several papers emphasise this from various points of view. The known intricacies of the membrane structure and physiological functions of T lymphocytes have been multiplying so rapidly of late that T-dependent interpretations of gerontological phenomena tend to age rather quickly; but this problem should be resolved within the next few years. Among other good chapters are two dealing with germ-free mice and congenitally athymic (nude) mice and their value in the study of ageing. Overall, the volume can be recommended to anyone seeking an introduction to both biological and clinical aspects of the subject, and the extensive reference lists make it an excellent source book.

I tried the title *Biological Amplification Systems in Immunology* on several immunological colleagues, inviting speculation on the contents of this volume. They produced a range of suggestions, none of which approximated to the truth. I can now reveal exclusively to readers of *Nature* that the book is about complement. Probably an expert on complement would have tumbled to it instantly, but then I don't think that the book is really intended for him. The 15 chapters cover the multiple roles of the complement system, as well as its biosynthesis, phylogeny, ontogeny and genetics. There are also discussions of leukocyte chemotaxis and of pathways activated by Hageman Factor. It seems a pity that this useful collection of reviews should be hidden under such an enigmatic title. **H. S. Micklem**

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