has been of crucial importance in some recent developments and can be seen at its best in such a book as *The large scale structure of space-time* by Hawking and Ellis, to the study of which the book under review would be an excellent propaedeutic. The beginning relativist should, of course, make himself familiar with both the old and the new approaches; often, one simply has to revert to using components, and, it is not unknown for a result to have been obtained first by the old fashioned methods and then established by a more modern method.

Frankel's book is mathematically elegant throughout and has a number of distinctive features. Einstein's field equations are obtained heuristically in a novel way and are then written in several geometric forms one of which is particularly neat. The Schwarzschild exterior and interior solutions are obtained in a non-standard way. Free use of differential forms (including de Rham's forms of odd kind) is made throughout and particularly in the chapters on electromagnetism, where their usefulness is shown to good effect in the short proof of the conformal invariance of Maxwell's equations.

The book covers most of the topics included in a first course on general relativity and stops short of matters such as the Kruskal metric, the Kerr black hole, singularities in space-time and the Weyl tensor. My only criticism of the book is that it contains no unworked examples by which the student can test his understanding of the theory.

D. MARTIN

DODSON, C. T. J. and POSTON, T. *Tensor geometry: the geometric viewpoint and its uses* (Pitman, 1979), xiii + 598 pp. £24.00; paperback, £9.95.

This book provides a first course on differential geometry which is eminently suitable for beginning theoretical physicists, especially those wishing to study the general theory of relativity. The treatment is very modern, the style is discursive and clear, and only a minimum of mathematical knowledge is assumed. Even an introductory chapter on sets, functions and the like is included. I doubt if this chapter and the next, which gives an introduction to linear algebra, are really necessary for the readers for whom the book is intended; there must be few honours graduates in physics nowadays who have not been exposed to some linear algebra (treated in a modern way) in their ancillary mathematics courses.

As the title of the book suggests the motivation is geometric wherever possible—there are plenty of diagrams—and coordinate-free methods are used throughout. At the same time, classical tensor calculus is by no means neglected, since results expressed in terms of components are so often required by the working physicist. The contents of the book include such matters as tensor algebra, manifolds, vector fields, covariant differentiation, the curvature and Weyl tensors, and geodesics; brief accounts of both special and general relativity are also included. A notable omission is a treatment of exterior differential forms, but this will appear in a subsequent volume. A plentiful supply of exercises is provided, some of the exercises consisting of theory broken down into self-contained parts, which gently lead the student to the desired result.

Anyone conscientious enough to work carefully through this book will lay a solid foundation of knowledge on which to build a proper understanding of the more sophisticated geometrical techniques commonly used in some parts of theoretical physics today.

D. MARTIN

ROSE, J. A. *A course on group theory* (Cambridge University Press, 1978), 310 pp., cloth £19.75, paper £8.25.

The number of textbooks on group theory at present available in the better bookshops is quite large. So the first question that comes to mind when a new book on group theory arrives on one's desk is whether it fills a gap and is deserving of publication. In the case of this book the answer is an unqualified yes.