modifications of the axioms of incidence and order. There is a neat treatment of Clifford parallels, and a proof that nothing like them can occur in hyperbolic geometry.

The book is well written, simple yet rigorous. On the other hand, it is slightly old-fashioned, long-winded in some places, and a little too much dominated by Hilbert. There is no history or bibliography; the names of Gauss and Bolyai, Cayley and Klein are seldom (if ever) mentioned.

H. S. M. COXETER

Tensor calculus. By J. L. Synge and A. Schild. (Mathematical Expositions, no 5.) University of Toronto Press, 1949. 12+324 pp. $6.00.

This book is an outgrowth of a series of lectures delivered by Professor Synge at the University of Toronto, Ohio State University, and Carnegie Institute of Technology. It is a general brief introduction to the calculus of tensors and its applications without the usual historical development of the subject. A short bibliography of some of the leading texts on the subject is given on page 319 and an index on pages 321–324.

There are eight chapters. The first four deal with the usual concepts of tensors, Riemannian spaces, Riemannian curvature, and spaces of constant curvature. The next three chapters are concerned with applications to classical dynamics, hydrodynamics, elasticity, electromagnetic radiation, and the theorems of Stokes and Green. In the final chapter, an introduction is given to non-Riemannian spaces including such subjects as affine, Weyl, and projective spaces. There are two appendices in which are discussed the reduction of a quadratic form and multiple integration. At the conclusion of each chapter, a summary of the more important formulas is given and also a set of exercises is included to illustrate the material of the chapter.

In the first two chapters the authors discuss the concepts of absolute tensors and Riemannian geometry. The equations of the geodesics are derived by the methods of the calculus of variations. After showing that the expressions for the covariant derivative of a vector form a tensor, the authors define parallel displacement of a vector along a curve by the vanishing of the absolute derivative. The elegant geometrical treatment of Levi-Civita of parallel displacement is not mentioned. Among other subjects treated are the Serret-Frenet formulas and the curvatures of a curve in a general Riemannian space. In the third chapter, the Riemannian curvature tensor is introduced by means of the commutation rule for the covariant second deriva-