

so sharp, but many topics with little or no coverage in *Foundations* are treated thoroughly here. Both books have some similarities also, but mostly derived from the unmistakably Rényiian presence as a teacher and researcher.

The first two chapters deal with probability spaces. Conditional probability spaces are also introduced. The general theory of random variables (Chapter 4) is preceded by a long chapter on the discrete case. A chapter on dependence is followed by an important chapter on characteristic functions of random vectors. While the method of characteristic functions is applied very little in *Foundations*, it is given full treatment in *Probability Theory*. The chapters on limit theorems make more use of that method. There is a long appendix on information theory. There are, of course, many more exercises than in *Foundations* and also more examples related with applications.

Both books complement each other well and have, as said before, little overlap. They represent nearly opposite approaches to the question of how the theory should be presented to beginners. Rényi excels in both approaches. *Probability Theory* is an imposing textbook. *Foundations* is a masterpiece.

ALBERTO R. GALMARINO

*A comprehensive introduction to differential geometry*, Volumes I and II, by Michael Spivak. Brandeis University, 1969.

The following is a review of volume I of Spivak's book and about half a review of volume II. In a subsequent issue of the BULLETIN I would like to say more about volume II. (I hope that volume III, now in the works, will by then have appeared.)

In the introduction "How this book came to be," Spivak makes the following remark, which I endorse (with some reservations, which I will try to spell out below). "Today a dilemma confronts any one intent on penetrating the mysteries of differential geometry. On the one hand one can consult numerous classical treatments of the subject in an attempt to form some idea of how the concepts within it developed."

"Unfortunately a modern mathematical education tends to make classical mathematical works inaccessible, particularly those in differential geometry. On the other hand one can now find texts as modern in spirit and as clean in exposition as Bourbaki's algebra. But a thorough study of these books usually leaves one unprepared to consult classical works, and entirely ignorant of the relationship between elegant modern constructions and their classical counterparts. Most students eventually find that this ignorance of the roots of a subject has its price—no one denies that modern definitions are clear, elegant, and precise; it is just that it is