Complex function theory, by Maurice Heins, New York, Academic Press, 1968.

In this book Maurice Heins has written what he feels should be included in a first course in complex function theory and also supplementary material. The result is a fairly standard treatment with the infusion of a rich variety of examples and special problems which reflect the author's long and fruitful experience in the field. The text is difficult with important material being included in the exercises; moreover, there are comparatively few routine exercises. Consequently it is hard to see how the book could be used at the undergraduate level except in an honors course. An ordinary graduate student without an undergraduate background in complex variables will also find the book difficult. For the qualified student, however, the book is admirably suited for a stern graduate course.

The book is divided into two parts, the first part according to the author being "a reasonable and, in fact, mathematically appealing program that can serve as a basis for the requirements in complex function theory for all doctoral candidates in mathematics at present." The author makes the book as self-contained as possible relying on the student's undergraduate experience for background rather than for foundations. Consequently, the first three chapters (I. The real field, II. The complex field. Limits, III. Topological and metric spaces) form a rigorous treatment of the foundations. Chapter IV (Complex differential analysis) introduces complex functions. The next four chapters (V. Cauchy theory, VI. Laurent expansions. Meromorphic functions, VII. Further applications of the Cauchy theory, VIII. The zeros and poles of meromorphic functions) develop the core of the subject. If one looks beyond the difficulty of the exercises in these chapters, one sees that Heins is constantly challenging the reader with imaginative problems whereby important and interesting theorems are proved. The good student (and many instructors) should find a course based on this book very stimulating. Chapter IX (The gamma and zeta function. Prime number theorem) does for Part I what the exercises do for the individual chapters; that is, the previous theory is applied to an interesting theorem.

The second part is a collection of topics designed to use and extend the experience gained in the first part. Here the treatment of topics is uneven. Some chapters are very short while others are fairly detailed so an instructor contemplating using the text should see how well his favorite advanced topic is covered. One can argue with the author as to what is essential and what is supplementary in complex function theory for a doctoral candidate. That is, one might say that some