abelian codes in this context. Chapter 5 gives a survey of the theory of group representations from the linear algebra point of view, and the last chapter utilizes this theory to construct codes for the Gaussian channel.

Only an introductory knowledge of modern algebra is needed to understand this book. The topics mentioned above are all developed and most of the theorems are proved. In addition, at the end of each chapter there are interesting exercises, many of which advance the theory. The more difficult exercises contain references. Comments are provided at the end of each chapter and an extensive set of references are at the end of the book. This book should provide a valuable tool for those mathematicians who have recently become interested in investigating some of the open problems in error-correcting codes as well as those already in the field. Areas requiring further investigation are noted in this book. This book could be a basis for an advanced undergraduate or graduate course in combinatorics, coding theory, or applications of modern algebra.

VERA PLESS

Braids, links, and mapping class groups, by Joan S. Birman, based on lecture notes by James Cannon, Annals of Mathematics Studies, No. 82, Princeton University Press, Princeton, New Jersey, 1975, 228+ix pp., $8.50.

Talleyrand is supposed to have said that nobody could know the full sweetness of life who had not lived before the French Revolution. One may say that nobody can know the full charm of topology who had to learn it after it became rigorous. Artin's first paper (published in 1925) on the theory of braids is a perfect and lasting monument of this charm. It is a paper containing almost exclusively ideas and results but practically no machinery. Birman's monograph gives a nearly complete account not only of Artin's results but also of the numerous important applications, later developments and generalizations of the theory of braids, many of which are due to the author. Her presentation is, of course, completely rigorous, but it is remarkable that she has been able to preserve much of the appeal to geometric intuition which helped to make Artin's paper so attractive.

The book is written in a concise but lucid style. The prerequisites are a solid knowledge of basic algebraic topology and familiarity with the elements of the theory of presentations of groups. Many more specialized concepts and theorems (as, for instance, the free differential calculus of R. Fox), are developed in detail and sometimes with new proofs. For some theorems, only an outline of the proof or only a survey is given. These cases are fully covered by references to the literature.

The first chapter begins with the definition of the pure (or unpermuted) braid group of a manifold M of dimension >2 as the fundamental group of the space

$$F_{0,n}M = \left\{ (z_1, \cdots, z_n) \in \prod_{i=1}^{n} M / z_i \neq z_j \qquad \text{if } i \neq j \right\}$$