perfect rings. However, this latter book does not discuss Q.F. rings, but gives instead a broad discussion of Morita equivalence and Morita duality. So in spite of a large overlap, the aims of the books are still different.

I close the review with expressing the hope that the fact that the book under review is written in German won't frighten too many prospective readers away.

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Hopf spaces, by Alexander Zabrodsky, Mathematics Studies, No. 22, North-Holland, Amsterdam, 1976, x + 223 pp., $18.50.

The subject of H-spaces is generally agreed to have begun in 1941 with the publication of Hopf's paper [5]. In the proceedings of the 1970 Neuchâtel conference on H-spaces, James [8] listed 347 entries for a bibliography on H-spaces. Since that time numerous articles on H-spaces have been published. It is therefore somewhat surprising that Zabrodsky's monograph is only the second book to appear which deals with H-spaces in general. Before discussing the book, I would like to provide some background on the subject itself.

It is quite easy to define the basic concept. An H-space (or Hopf space) consists of a topological space X with chosen point $* \in X$ and a continuous function μ: $X \times X \to X$ called the multiplication or H-structure on X. The requirement is that $*$ be a two-sided unit up to homotopy, that is, the maps $x \to \mu(x, *)$, $x \to \mu(*, x)$, and the identity map of X are all to be homotopic. If in the definition we replace homotopy by equality and write $\mu(x, y)$ as $x \cdot y$, we obtain $x \cdot * = * \cdot x = x$. The multiplication is then called strict and we shall refer to the resulting object as a topological quasi-group, a precursor of a topological group. Two important classes of examples of H-spaces are topological groups and the space of loops ΩY of an arbitrary space Y. The latter consists of continuous paths in Y parametrized by [0, 1] which begin and end at a fixed point of Y with multiplication of paths the same as in the definition of the fundamental group. H-spaces are studied because they are a natural object in homotopy theory and because they are a unifying concept