bundle are defined using the Chern classes of the complexification of the vector bundle. These are integral characteristic classes in dimensions divisible by 4. With this, all of the characteristic classes to be considered in the book have been defined.

The rest of the body of the text is devoted to applications of the characteristic classes. First is an application to partial calculation of the cobordism groups. It is shown that the vanishing of all Pontrjagin numbers of a smooth compact oriented manifold are necessary conditions for the manifold to be a boundary. This leads to the study of the oriented cobordism ring and to a calculation of the tensor product of this ring with the rationals.

Next is a proof of the signature theorem using multiplicative sequences. This theorem expresses the signature of a smooth compact oriented manifold in terms of Pontrjagin numbers of M. It is applied to prove that the rational Pontrjagin classes of a smooth compact oriented manifold are piecewise linear invariants of the manifold. In fact, rational Pontrjagin classes are defined for compact rational homology manifolds and these combinatorial Pontrjagin classes are shown to agree with the differentiable ones for smooth manifolds. As one application of this, it is shown that for every dimension $\geqq 8$ there are two smooth simply-connected manifolds having the same homotopy type but not piecewise linearly homeomorphic. Another application is to provide an example of a triangulated 8-dimensional compact manifold having no compatible smooth structure.

In addition to those results dealing directly with characteristic classes the book contains a discussion of various topics of interest in algebraic and differential topology which are relevant to the text. The epilogue is a brief survey of results since the original notes appeared. It has three parts, one devoted to generalizations of the theory to nonsmooth manifolds, one devoted to the theory for smooth manifolds with additional structure, and one devoted to generalized cohomology theories.

As can be seen from this discussion of the contents, there is a lot of mathematics included in the book. It is a valuable and welcome addition to the literature.

E. H. SPANIER

Lie groups, Lie algebras, and their representations, by V. S. Varadarajan, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1974, xiii+430 pp., $19.95

Compact Lie groups and their representations, by D. P. Želobenko, Translations of Mathematical Monographs, Vol. 40, American Mathematical Society, Providence, R.I., 1973, viii+448 pp., $35.70

The books by Varadarajan and Želobenko are surprisingly dissimilar. Both are written as detailed mathematical expositions of the theory of representations of compact Lie groups. But Varadarajan's is written with mathematics students in mind, whereas Želobenko's is influenced by the needs of theoretical physicists.