

# The Topology of FIBRE BUNDLES

*by Norman Steenrod*

THE subject of fibre bundles, initiated fifteen years ago, has enjoyed an intensive development by a number of authors in the journals of mathematics. It embodies the main applications of topology to differential geometry, in particular, to the study of properties "in the large" of differential manifolds. It includes also a topological study of the coset decompositions of Lie groups by subgroups, and the theory of covering spaces used in analysis. This book is the first organized account of the subject.

A fundamental tool of mathematics is the concept of the graph of a function in the cartesian product of two spaces. But it is not adequate for the study of tensor fields on manifolds. An adequate concept is obtained by replacing cartesian product by the more general notion of fibre bundle and replacing graph by *cross-section*. A fibre bundle is much like a cartesian product but allows for *twisting* in the large, e.g., compare a cylinder with a Möbius band. The tensors of any specified algebraic type on a differential manifold always form a fibre bundle which is itself a differential manifold.

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