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Decompositions of manifolds, by Robert J. Daverman. Academic Press, Orlando, 1986, xi+317 pp., $55.00. ISBN 0-12-204220-4

Upper semicontinuous decompositions were introduced by R. L. Moore in 1924 [**9**]. The first major result of the theory was Moore's theorem [**10**] that if G is an upper semicontinuous decomposition of the plane $\mathbf{R}^2$ into compact connected nonseparating sets, then the associated decomposition space is topologically equivalent to the plane.

During the next twenty-five years or so, the theory of upper semicontinuous decompositions was developed extensively, especially by Moore and members of his school. This theory was applied to the study of continua and locally connected continua, the plane and 2-manifolds, mappings of special types (open, monotone, and light in particular), and dimension theory.

Generalizing the Moore theorem on decompositions of $\mathbf{R}^2$ has been a goal of the theory of upper semicontinuous decompositions. A number of the major results of the theory are of the following type: If G is an upper semicontinuous decomposition of a space X, and G and X have certain properties, then the associated decomposition space is homeomorphic to X.

In the nineteen fifties there was considerable work on trying to establish a theorem for $\mathbf{R}^3$ analogous to Moore's theorem on decompositions of $\mathbf{R}^2$. G. T. Whyburn [**12**] had suggested in 1936 the property (named later) of being pointlike as a candidate to replace nonseparation in the plane case. A compact connected pointlike set in $\mathbf{R}^3$ behaves homeomorphically like a point. But in the fifties, Bing discovered his famous dogbone decomposition of $\mathbf{R}^3$ [**3**], a decomposition of $\mathbf{R}^3$ into compact connected pointlike sets for which the decomposition space is topologically distinct from $\mathbf{R}^3$.

Beginning with Bing's work in the fifties, there has been a major emphasis in decomposition theory on the study of manifolds. This theory has been developed extensively and has contributed in a major way to the development of geometric topology, especially the study of the structure and properties of manifolds, and embedding theory. It has also yielded a number of major results in topology. Among these are the following:

(1) The existence of nonstandard periodic homeomorphisms of $\mathbf{R}^n$ and S^n for $n \geq 3$ [**1**, **2**].

(2) The existence of nonmanifold factors of $\mathbf{R}^n$ for $n > 3$ [**3**].

(3) The generalized Schönflies Theorem [**4**].

(4) The proof that if H^n is a homology n-sphere, its double suspension $\Sigma^2 H^n$ is an $(n+2)$-sphere [**5**, **6**].

In addition, Freedman's solution of the 4-dimension Poincaré conjecture [**7**] made essential use of this theory.

The foundations for the current theory were laid by Bing with his work, especially that of the fifties. Several of the fundamental ideas and techniques are due to him, and his influence still shapes the growth of the theory. Although Bing's work dealt primarily with $\mathbf{R}^3$, much of it could be readily extended to $\mathbf{R}^n$ and, with some technical changes, to n-manifolds.