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Geometry of spheres in normed spaces, by Juan Jorge Schäffer, Lecture Notes in Pure and Appl. Math., vol. 20, Dekker, New York, 1976, vi + 228 pp., $24.50.

Geometric properties of the unit sphere of a Banach space have proved to give much information about the general nature of the space. For example, it has long been known that a Banach space is reflexive if its unit sphere is uniformly convex; this has been strengthened, so that it is now known that X is isomorphic to a space for which no two-dimensional sections of the unit sphere are nearly squares if and only if X is super-reflexive (no nonreflexive space has all its finite-dimensional subspaces "nearly isometric" to subspaces of X). Another spectacular example is the fact that all infinite-dimensional Banach spaces have arbitrarily large finite-dimensional subspaces that are nearly Euclidean, which has been widely useful and revealing. This book contains much new information about certain aspects of the geometry of unit spheres. It might be described as a detailed and comprehensive study of the girth, perimeter, radius, and diameter of unit spheres of Banach spaces. This field is new and interesting, perhaps even weird. It is not yet clear how important it will be for the study of Banach spaces, but it has connections with several concepts of current research interest, e.g., super-reflexivity, the Radon-Nikodým property, infinite trees, and preduals of $L^1(\mu)$-spaces. Although accessible to beginning students, the book seems primarily of value to research mathematicians interested in some of the concepts mentioned in this review. A nonspecialist might be confused by the frequent mixing of important and not-so-important facts.

With the aim of minimizing details and giving a feeling of the type of results involved, it seems best to describe some interesting facts about the