The application of exponential transformations to the three fundamental variables is the subject of chapter seven. The complex variable $H=-e^{-M}$ and its linear transformations determines the stereographic projections. Similarly $\Lambda=-e^{-\alpha M}$ provides the conic projections.

In chapter eight is outlined the method of conformal displacement on the spheroid from one reference point to arbitrarily selected alternative reference points. Chapter nine surveys briefly some of the more geographical aspects of the several types of projections and mentions briefly other than conformal types. The work is concluded with a chapter providing an extensive set of auxiliary formulae and analytical relations.

This contribution represents an unusually exhaustive treatment of a fairly practical application of differential geometry and conformal transformation. The organization is good though overburdened with multiplicity of formulas. This is somewhat mitigated by a formula summary at the end of each chapter. The important characteristics of conformal maps are treated so as to provide an adequate basis for any further work. This volume and apparently the one to follow refers to the conformal projection almost exclusively. While this is of primary concern in higher geodesy it would seem appropriate in a basic treatise on cartography to give more than a cursory treatment to equal-area and the several geometrically defined projections such as the polyconic.

NEWMAN A. HALL

BRIEF MENTION

Problèmes de propagations guidées des ondes électromagnétiques. 2d ed. By L. de Broglie. Paris, Gauthier-Villars, 1951. 8+118 pp. 1100 fr.

This text is concerned with the classical phases of the theory of guided electromagnetic waves and as such does not discuss the developments made in the United States and Great Britain during the past ten years. Chapter I summarizes the basic facts regarding Maxwell's equations. They are written in Cartesian as well as orthogonal curvilinear coordinates. Complex representation of the field quantities and some of the useful potentials are discussed. Attention is turned to wave guides in Chapter II. For purposes of illustration four different cross sections are discussed: rectangular, circular, coaxial, and elliptic. The chapter closes with a brief but informative section on methods of excitation as well as transient effects. Chapter III is concerned with characteristic frequencies of electromagnetic cavities of several shapes: the parallelepiped, right circular cylinder, torus of rectangular and circular cross sections, and sphere.

In Chapter IV, account is taken of losses in guides. First the effect of a nonperfect conductor is discussed with reference to the skin-effect. This leads to the study of attenuation losses which are discussed for some special cases in an approximate and an exact fashion. Chapter V deals with a discussion of propagation in horns. Several geometries are considered, the right circular cone, biconical horn, the sectoral horn and the parabolic mirror. For these geometries, the solution of Maxwell's equations are given in detail. The closing chapter deals with Huyghens' principle and the diffraction of electromagnetic waves at the opening of a guide or a horn. Kottler's representation for the electromagnetic field is given and the chapter closes with some specific applications. A good fraction of the references pertain to post-war contributions of the French school.

ALBERT E. HEINS

Elements of the topology of plane sets of points. 2d ed. By M. H. A. Newman. Cambridge University Press, 1951. 8+209 pp.

This is a new edition of Newman's very useful and readable book on the topology of the plane published in 1939 (see the review in Bull. Amer. Math. Soc. vol. 45). The text has been revised extensively and there are a number of changes in the choice and arrangement of topics. For example, the sections on the boundary elements of domains and on the connectivities of certain closed sets have been replaced by a section on the orientation and intersection of plane curves. The first part of the book, dealing with the general topology of metric spaces, has been augmented by a section on complete spaces and by discussions of the properties of various vector spaces of infinite dimension. In the chapter on separation theorems the author has added a short proof of the implicit function theorem as an application of Brouwer's theorem on the invariance of regionality (established for arbitrary dimension despite the fact that the book deals primarily with the plane). The proof of the so-called stronger form of Cauchy's integral theorem has been agreeably shortened. On the other hand the proof of the Jordan separation theorem—essentially that of Alexander—seems a trifle longer. Here no doubt is a reflection of the author's purpose of presenting the proof of this famous theorem with such care as to make it accessible to mathematicians generally, not merely to those who will read the book as an admirable introduction to a systematic training in topology.

P. A. SMITH