principle in the dynamics of the atmosphere. It is also gratifying to find at last in meteorological literature the name of Kelvin mentioned (p. 58) in connection with the problem of convective instability of moist air, which he treated for the first time in 1865. In his treatment of the heat balance of the atmosphere the author fails to stress a fundamental difficulty, which is our ignorance, at present, of the radiative behaviour of water vapor under atmospheric conditions. The result of Hergessel referred to on page 76, that in a semi-grey atmosphere at radiative equilibrium there would exist a uniform temperature of $-54°C$, has been shown to be incorrect.*

On the whole the book offers a convenient exposition of present-day problems of dynamic meteorology.

C. L. PEKERIS

Technique de la Méthode des Moindres Carrés. By Henri Mineur. (Monographies des Probabilités, publiées sous la direction de M. Émile Borel, no. 2.) Paris, Gauthier-Villars, 1938. 8+93 pp.

Mineur states in the preface of his book that it should be possible for the reader to learn to use the method of least squares without understanding the theory behind it. In fact, the theory of the various operations is not fully explained until the fifth chapter. For this reason the mathematician will perhaps find it more satisfactory to proceed directly from the first chapter to the fifth and then read the second, third, and fourth. We shall follow this order in discussing the topics which Mineur treats.

The first chapter consists of an example for which it is desired to fit a linear equation to a set of data. The attempt to make such an equation conform exactly leads in general to an incompatible system. The equation which is the best fit in the sense of least squares is shown in Chapter 5 to result from the so-called normal equations which are compatible and linear. The resolution of a linear system by means of determinants is cumbersome and hence the author presents the Gaussian method which constitutes the principal part of the technique. The method of least squares is shown to be equivalent to finding the equation which produces the minimum probable error. Also in Chapter 5 one finds a discussion of such concepts as mean, standard deviation, probable error of a single measurement, and probable error of the mean of a set of measurements. In fact the author gives a brief but clear exposition of the elements of statistics. It is, however, surprising that simple, multiple, and partial correlation are omitted.

Chapter 2 contains a detailed description of the method of tabulating the data, forming the normal equations, and solving them. Mineur fails to note that much of this tabulation is unnecessary when a computing machine is used. For example, by means of a machine it is possible to obtain a sum of products as a single operation without recording the individual products. In Chapter 3 the author discusses the nature of errors of measurement. He also indicates how the method of least squares can be applied to nonlinear equations. In Chapter 4 he applies his method to the solution of a problem in stellar statistics.

On the whole, this is a readable and useful book.

A. H. COPELAND

British Association for the Advancement of Science: Mathematical Tables. Volume 6: *Bessel Functions.* Part 1: *Functions of Orders Zero and Unity.* Cambridge, University Press; New York, Macmillan, 1937. 20+288 pp.

The preface to this volume opens with the words: "It is with the satisfaction of

* C. L. Pekeris, Gerlands Beiträge, vol. 28 (1930), p. 377.