Variationsrechnung. Volume I. By L. Koschmieder. Berlin, de Gruyter, 1933. 127 pp.

This little volume is Number 1074 of the Sammlung Göschen. It contains in compact form an introduction to the calculus of variations following rather closely the method of exposition inaugurated by Bolza. The first chapter states the general problem to be considered and lists a number of typical examples. The second chapter is devoted to the problem which involves free variations with fixed end points, and the classic conditions associated with the names of Euler, Jacobi, and Weierstrass are developed. In general the details are limited to continuous solutions in euclidean space of two dimensions. The extension to the case of variable end points is made in the third chapter and the book closes with a fourth chapter on isoperimetric problems.

The limitation of space imposed by the small size of the books in this collection of texts has made it necessary to discuss only simple integrals in this volume. More advanced topics, including higher derivatives, multiple integrals, the problem of Mayer, and discontinuous solutions, have been reserved for a second volume.

W. R. LONGLEY

Spectres Moléculaires. By P. Swings. (Actualités Scientifiques et Industrielles, No. 74.) Paris, Hermann, 1933. 51 pp.

This monograph gives an account of molecular spectra based on the assumption of two nuclei and a single optical electron. The treatment is very brief and obviously intended for specialists; only results are given, and for a discussion of the various mathematical questions involved the reader is referred to original papers and to Weizel's treatise on band-spectra.

F. D. MURNAGHAN

Theory of Linear Connections. By D. J. Struik. Berlin, Springer, 1934. vii+68 pp.

The book under review deals with the developments of differential geometry of the past decade and a half. It first defines the different "geometrical objects" to be considered, among which are the various "linear connections", to whose theory the book is devoted.

One of the main purposes of a linear connection is to obtain invariants of higher orders from a given invariant. How this is accomplished is shown first for affine, then for projective, conformal, hermitian, and spin connections.

It is unfortunate that the book contains a number of inaccuracies, such as the one in §10, where instead of a simple group one should have a simply transitive one. On page 29, there is some confusion between normal and geodesic coordinates; the statement that conformal normal coordinates may be constructed is no doubt correct, but so far no one has succeeded in obtaining them.

The historical remarks give a brief account of the growth of this subject, but some of the discoveries are not attributed to the right people. However, the book is quite useful, as the calculations that are so prevalent in tensor analysis are for the most part omitted, and the bibliography is quite complete.

M. S. KNEBELMAN