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978-1-107-49359-9 - The Elementary Theory of the Symmetrical Optical Instrument

J.G. Leathem

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THE ELEMENTARY THEORY  
OF THE  
SYMMETRICAL  
OPTICAL INSTRUMENT

by

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and University Lecturer in Mathematics

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## PREFACE

IN Gauss's *Dioptrische Untersuchungen* there is little trouble with sign conventions, and continued fractions are not employed. These are, however, prominent features in more recent presentations of the first-order theory of the optical instrument, and render the subject somewhat difficult to the beginner.

It is the aim of the present Tract to eliminate all unnecessary difficulties and to give a quite elementary account of the theory; and, to this end, it has seemed desirable to follow (in Sections I—IV) the general lines of Gauss's memoir. I am indebted to a suggestion of Mr T. J. P.A. Bromwich for a feature of the present scheme which seems to me to mark a great advance in simplification, namely the postponing of the study of the functional form of the constants of the instrument till after its general optical properties have been established, and the employing of an elementary theorem in algebraic linear transformations to obtain the fundamental equations and the relation between the constants.

Limits of space have prevented any close examination of the application of the theory to particular instruments, but one or two questions in connection with the equivalent thin lens and the adjustment of field-glasses, not usually treated in text-books, have been discussed; and a few pages have been devoted to bringing reflecting instruments within the scope of the theory.

In Section IX a brief and, I hope, easy account is given of the third-order aberrations.

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Frontmatter

[More information](#)

vi

## PREFACE

I am deeply indebted to Mr Bromwich for reading the manuscript, for his assistance in drawing up the syllabus which constitutes Section X, and for other most valuable suggestions. My thanks are due to Mr W. M. Page, Fellow of King's College, for reading the proofs, and to Mr S. D. Chalmers, of the Northampton Institute, for giving me the benefit of his knowledge of technical optics.

J. G. L.

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[More information](#)

## CONTENTS

	PAGE
PREFACE . . . . .	v
I. Approximate formulæ for a succession of refractions at nearly normal incidence . . . . .	1
II. The mathematical solution of the refraction problem for a symmetrical instrument . . . . .	8
III. The optical properties of a symmetrical instrument . . . . .	17
IV. The manner in which the optical properties of an instrument depend on its constitution . . . . .	26
V. The equivalent thin lens . . . . .	36
VI. Reflecting instruments . . . . .	39
VII. Entrance and exit pupils . . . . .	43
VIII. Chromatic defects of the image . . . . .	44
IX. The aberrations of the third order . . . . .	58
X. Syllabus of propositions concerning the characteristic function and the focal lines of a pencil of rays of light . . . . .	66