

**CAMBRIDGE  
MATHEMATICAL SERIES.  
AN ELEMENTARY TREATISE  
ON GEOMETRICAL OPTICS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649053889

Cambridge Mathematical Series. An Elementary Treatise on Geometrical Optics by W. Steadman Aldis

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**W. STEADMAN ALDIS**

**CAMBRIDGE  
MATHEMATICAL SERIES.  
AN ELEMENTARY TREATISE  
ON GEOMETRICAL OPTICS**



*CAMBRIDGE MATHEMATICAL SERIES.*

AN ELEMENTARY TREATISE ON  
GEOMETRICAL OPTICS.

*BY THE SAME AUTHOR.*

**AN ELEMENTARY TREATISE ON SOLID GEOMETRY.**

4th edition, revised. Crown 8vo. 6s.

**AN INTRODUCTORY TREATISE ON RIGID DYNAMICS.**

Crown 8vo. 4s.

**A CHAPTER ON FRESNEL'S THEORY OF DOUBLE REFRACTION.** 2nd edition, revised. 8vo. 2s.

AN  
ELEMENTARY TREATISE  
ON  
GEOMETRICAL OPTICS.

*William*  
BY  
W. STEADMAN ALDIS, M.A.,

TRINITY COLLEGE, CAMBRIDGE,  
PROFESSOR OF MATHEMATICS IN THE UNIVERSITY COLLEGE, AUCKLAND,  
NEW ZEALAND.

FOURTH EDITION.

CAMBRIDGE:  
DEIGHTON, BELL, AND CO.  
LONDON AND NEW YORK: GEORGE BELL & SONS.  
1893



**Cambridge:**

**PRINTED BY G. J. CLAY, M.A. & SONS,  
AT THE UNIVERSITY PRESS.**



Math Lib  
Gift  
Mrs J. O. Reed  
4-12-33

## CONTENTS.

| CHAP.   | PAGE |
|---|------|
| I. Laws of Reflection and Refraction . . . . .              | 1    |
| II. Reflection and Refraction of Direct Pencils . . . . .   | 15   |
| III. Reflection and Refraction of Oblique Pencils . . . . . | 34   |
| IV. On Reflections at Two or more Plane Surfaces . . . . .  | 47   |
| V. On Refraction through Prisms and Plates . . . . .        | 59   |
| VI. On Refraction through Lenses . . . . .                  | 76   |
| VII. On Images and Simple Optical Instruments . . . . .     | 95   |
| VIII. On Compound Optical Instruments . . . . .             | 107  |
| IX. On Dispersion and Achromatic Combinations . . . . .     | 129  |
| X. Miscellaneous Theorems . . . . .                         | 146  |
| XI. The Rainbow . . . . .                                   | 161  |

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

## PREFACE.

THE main object of the present treatise is to supply a text-book on Geometrical Optics to students reading for the Mathematical Tripos at Cambridge, who do not wish to proceed much beyond those portions of the subject which are required for the first part of the Tripos Examination.

The investigations are therefore not carried beyond *first approximations*. The discussion of the position of the foci of obliquely incident pencils has, however, been brought within this boundary, instead of being derived from the second approximations for direct pencils.

The Author hopes that the book may be useful to a wider class of students, not residing in any University, by giving to them a concise view of the mathematical explanation of instruments, with the practical details of which they are familiar.