

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

---

CONDUCTION OF ELECTRICITY  
THROUGH GASES

IN TWO VOLUMES

VOLUME I

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

---

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

# CONDUCTION OF ELECTRICITY THROUGH GASES

by

SIR J. J. THOMSON, O.M., F.R.S.

MASTER OF TRINITY COLLEGE, CAMBRIDGE  
PROFESSOR OF EXPERIMENTAL PHYSICS  
CAMBRIDGE

and

G. P. THOMSON, M.A.

FELLOW OF CORPUS CHRISTI COLLEGE, CAMBRIDGE  
PROFESSOR OF NATURAL PHILOSOPHY IN THE  
UNIVERSITY OF ABERDEEN

THIRD EDITION

VOLUME I

General Properties of Ions  
Ionisation by Heat and Light

CAMBRIDGE  
AT THE UNIVERSITY PRESS

1928

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS  
Cambridge, New York, Melbourne, Madrid, Cape Town,  
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press  
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)  
Information on this title: [www.cambridge.org/9781107414273](http://www.cambridge.org/9781107414273)

© Cambridge University Press 1928

This publication is in copyright. Subject to statutory exception  
and to the provisions of relevant collective licensing agreements,  
no reproduction of any part may take place without the written  
permission of Cambridge University Press.

First Edition 1903  
Second Edition 1906  
Third Edition (in Two Volumes)  
Volume I 1928  
First published 1928  
First paperback edition 2013

*A catalogue record for this publication is available from the British Library*

ISBN 978-1-107-03883-7 Hardback  
ISBN 978-1-107-41427-3 Paperback

Cambridge University Press has no responsibility for the persistence or  
accuracy of URLs for external or third-party internet websites referred to in  
this publication, and does not guarantee that any content on such websites is,  
or will remain, accurate or appropriate.

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

## PREFACE TO THE THIRD EDITION

THE preparation of this Edition was commenced some fifteen years ago and some of it was in type when the War broke out. After the War the pressure of other duties left me with little leisure for the very heavy task of dealing with the vast number of researches on the Discharge of Electricity through Gases which have been made since the publication of the Second Edition. The publication of this Edition is due to my having had the co-operation of my son, Professor G. P. Thomson, who has done most of the work required for its preparation. The growth of the subject has made it impossible to deal with it in one volume of moderate size; it has been necessary to extend the book to two volumes, of which this is the first, and which deals with what may be described as the general properties of ions.

We have adopted a decimal notation for numbering the paragraphs, those that were in the Second Edition are denoted by integers and those dealing with subjects cognate to the original paragraph by this integer, followed by a decimal. Most, though not all, of the original paragraphs have been retained, a few in a shortened form. Otherwise little alteration has been made in them beyond replacing the values of the fundamental constants by the more accurate ones obtained since the publication of the earlier editions. Some of these paragraphs deal with matters which are now chiefly of historic interest and which might have been omitted or curtailed if we had been re-writing the book. There seems, however, to be some advantage in maintaining continuity with the older editions, and perhaps after all Science is more easily digested when it is lightened by something less formidable than mathematical analysis or the precautions which must be taken to get the greatest accuracy in the determination of physical constants. We are indebted for the Name Index to Mrs G. P. Thomson, to whom we offer our sincere thanks.

J. J. THOMSON

TRINITY LODGE

*August 1928*

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

---

Cambridge University Press

978-1-107-41427-3 - Conduction of Electricity Through Gases: Third Edition: Volume I

Sir J. J. Thomson and G. P. Thomson

Frontmatter

[More information](#)

## CONTENTS OF VOLUME I.

CHAP.	PAGE
I. Electrical Conductivity of Gases in a Normal State .	1
II. Properties of a Gas when in the Conducting State .	13
III. Mobility of Ions . . . . .	85
IV. Mathematical Theory of the Conduction of Electricity through a Gas containing Ions . . . . .	193
V. Effect produced by a Magnetic Field on the Motion of the Ions . . . . .	215
VI. Determination of the Ratio of the Charge to the Mass of an Ion . . . . .	229
VII. Determination of the Charge carried by the Negative Ion . . . . .	291
VIII. On some Physical Properties of Gaseous Ions . .	310
IX. Ionisation by Incandescent Solids . . . . .	338
X. Ionisation in Gases from Flames . . . . .	399
XI. Ionisation by Light. Photo-Electric Effects . .	435
Name Index . . . . .	483
Subject Index . . . . .	487
<hr/>	
Plate I. Positive Ray Parabolas . . . . .	<i>to face p.</i> 272
Plate II. Wilson Tracks . . . . .	<i>between pp.</i> 336-7