Electromagnetic theory of light

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BY
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PART I.

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PREFACE.

In the following work I have endeavoured to account for the manifold phenomena of light as electromagnetic phenomena, deriving the same from the fundamental differential equations for electromagnetic disturbances. I have treated in Part I. the more familiar phenomena that can be explained by Maxwell's theory, and have reserved for Part II. those for which his theory fails to offer a satisfactory explanation.

In the treatment of the subject-matter, I have laid more stress on a rigorous development of the fundamental laws of optics than on the derivation of the many consequences or secondary laws, that can be deduced from the former by familiar principles, and have little to do with our conception of the nature of light; for the consequences or secondary laws that can thus be deduced I refer the reader to the various text-books on optics, in which the same are most extensively treated. I have also omitted a description of all experiments on the subject-matter treated and have referred to empirical facts only where a comparison with the theoretical results has seemed of interest.

At the beginning of each chapter I have endeavoured to give a brief historical sketch of the subject-matter treated; and each chapter has been developed as independently of the preceding ones, as the treatment of the subject has allowed. Examples pertaining to the matter treated in the text have been added at the end of each chapter; these have been of great service to me in the general treatment of the principles set forth in the text, and I hope they may prove as useful to the reader.
The spherical waves and the so-called primary and secondary waves, which have been so extensively treated in the first four chapters, are perhaps only of theoretical interest. One of my chief reasons for the elaborate treatment of this peculiar class of waves has been to indicate another fertile field of research offered by Maxwell's equations. For those interested only in the more familiar phenomena of electromagnetic wave-motion those portions of the text can be omitted.

In the treatment of the familiar problems on optics I have made free use of all sources with which I am acquainted, but in particular of Preston's "Theory of Light," Helmholtz's "Vorlesungen über die Electromagnetische Theorie des Lichts," Volkmann's "Vorlesungen über die Theorie des Lichtes," and Drude's "Lehrbuch der Optik."

I have to return my best thanks to Prof Dr. K. Fischer, Munich, for many valuable suggestions, as well as for a most careful revision of the proofs.

C. E. CURRY.

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CONTENTS.

CHAPTER I.
INTRODUCTION.


Spherical Waves—Purely Spherical Waves—The Point r=0—The Derivatives of φ as Integrals—The Particular Integral \( \frac{d\phi}{dx} \)—The Particular Integral \( \frac{d^2\phi}{dx^2} \). The Particular Integral \( \frac{d^\phi}{dx dy} \)—The Particular Integral \( \frac{d^\phi}{dx^2 dy^2 dz^2} \), \( \lambda + \mu + \nu = n. \) pp. 17-23

Examples. pp. 24-26

CHAPTER II.

SPHERICAL ELECTROMAGNETIC WAVES: PRIMARY AND SECONDARY WAVES; PECULIAR PROPERTIES OF SECONDARY WAVE; THE ROENTGEN RAYS.

Problem 1—Electric and Magnetic Oscillations at ⊥ to each other—Magnetic Oscillations at ⊥ to Direction of Propagation—The Electric Wave as Resultant of two Waves—The Electric Waves at great Distance from Source—The Electric Waves near Source—The Magnetic Wave. pp. 30-34

Linearly Polarized Light—Primary and Secondary Waves—Analogy between Primary and Secondary Waves and Primary and Secondary Currents—The Roentgen Rays. pp. 34-36

Problem 2—The Primary and Secondary Electric Waves—The Magnetic Wave—Regions in which the Primary Wave disappears—Region 1: The Three Coordinate-Axes—Region 2: The $yz$ and $β^2=γ^2$ Planes—Region 3—Proof of General Laws—The Electric and Magnetic Oscillations take place at ⊥ to each other—The Magnetic Oscillations take place at ⊥ to their Direction of Propagation—The Primary Oscillations take place at ⊥ to their Direction of Propagation—The Secondary Oscillations do not take place at ⊥ to their Direction of Propagation—Determination of the Angle of Oscillation—Regions in which the Secondary Oscillations are Longitudinal—Regions in which the Secondary Oscillations are Transverse—The Secondary Oscillations of the $yz$-Plane; Rotation of their Direction of Oscillation through $90^\circ$—The Secondary Oscillations of the $xz$-Plane; Rotation of their Direction of Oscillation through $180^\circ$—The Secondary Oscillations of the $xy$-Plane—The Primary Wave—The Secondary Wave. pp. 36-47

Problem 3—The Wave-Length $λ$—Regions in which Primary Wave disappears—Region 1: The Vectors $a : β : γ = a_1 : a_2 : a_3$—Region 2: A Surface—The Magnetic Waves—The Wave-Length $λ$—Explicit Formulae for Moments—Distinction between Light and Electric Waves; the Quantity $n$—Electric and Magnetic Oscillations at ⊥ to each other—Magnetic and Primary Electric Oscillations at ⊥ to Direction of Propagation—Determination of the Angle ($f_θ$ $r$)—The Hemisphere $θ=0^\circ$ to $90^\circ$—The Hemisphere $θ=90^\circ$ to $180^\circ$—The Longitudinal Secondary Electric Wave—The Transverse Secondary Electric Wave. pp. 47-63

The Primary Electric Waves—The Secondary Electric Waves; the Roentgen (X) Rays—Summary. pp. 63-64

Examples. pp. 65-71

CHAPTER III.

LINEARLY, CIRCULARLY, AND ELLIPTICALLY POLARIZED OSCILLATIONS; GENERAL PROBLEM OF ELLIPTICALLY POLARIZED ELECTROMAGNETIC OSCILLATIONS.

Different Kinds of Light—Polarized Light—Ordinary Light—Plane of Polarization—Elliptically Polarized Oscillations—Mode of Propagation of Elliptic Oscillations—Circularly Polarized Oscillations—Right and Left-handed Circular (Elliptic) Oscillations—Linearly Polarized Oscillations—The Elliptic Polarization the most general. pp. 72-79
CONTENTS.

The Electromagnetic Waves of Chapter II.—More General Problem; Elliptically Polarized Electromagnetic Oscillations—Electric and Magnetic Moments at ⊥ to each other—The Primary Wave—The Vector $X_1, Y_1, Z_1$ at ⊥ to Direction of Propagation—The Path of Oscillation—The Conic (14) an Ellipse—The Particular Case $A_1B_2 = A_2B_1$—Path of Oscillation determined by Intersection of Elliptic Cylinders; Primary Wave Elliptically Polarized. pp. 79-85

The Secondary Wave; Determination of the Angle $(f, r)$—The Vector $X_2, Y_2, Z_2$ rotates in a Plane—Determination of Normal to Plane of Oscillation—Regions in which the Secondary Oscillations take place at ⊥ to Direction of Propagation—Path of Oscillation—Path of Oscillation determined by Intersection of Elliptic Cylinders; Secondary Wave Elliptically Polarized—Confirmation that the Elliptic Cylinders intersect in Plane Closed Curves. pp. 85-96

The Magnetic Oscillations Elliptically Polarized in Planes at ⊥ to Direction of Propagation. p. 96

Examples. pp. 96-104

CHAPTER IV.

INTERFERENCE; INTERFERENCE PHENOMENA OF THE PRIMARY AND SECONDARY (ELECTROMAGNETIC) WAVES.

Doctrine of Interference—Interference of Plane-Waves—Phenomena of Interference: Bright and Dark Bands—Distance of any Band from Central Point—Width of Band—Coloured Bands or Fringes. pp. 105-111


The Electromagnetic Waves; those of Problem 3, Chapter II.—Superposition of two Primary Waves—The Resultant Primary Wave; its Amplitude and Phase—Examination of Expression for Amplitude—Resultant Primary Wave Elliptically Polarized; Conditions for Linear Polarization of Resultant Wave—The Sources of Disturbance near together and the Point of Observation at great Distance—Examination of Expression for Resultant Amplitude; its Behaviour for Light Waves—Behaviour of Expression for Resultant Amplitude for Electromagnetic Waves Proper—The Interference-Term; Evaluation of same for given case—Breadth of Interference—Band—Summary: Laws of Interference. pp. 117-128
CONTENTS.

Superposition of two Secondary Waves—The Resultant Secondary Wave Elliptically Polarized—Sources of Disturbance near together and Point of Observation at great Distance—Expression for Resultant Amplitude—Behaviour of Resultant Amplitude for Light-Waves—Behaviour of Resultant Amplitude for Electromagnetic Waves Proper—Interference-Phenomena of the Primary and Secondary Waves; those in Regions, where the latter alone appear—Point of Observation near Sources of Disturbance; Expression for Amplitude of Resultant Secondary Wave—The Sources of Disturbance on $x\text{-Axis}$; Coefficient of Interference-Term—Coefficient of Interference-Term on Screen || $yz$-Plane—Regions of greatest Interference—Expression for Resultant Amplitude on Screen; approximate Expressions for same in Regions of greatest Interference. - - - - - - - - - - - - - pp. 126-133

The Electromagnetic Waves of the General Problem of Chapter III. and Phenomena of Interference. - - - - - - - - - - - - p. 133

Examples. - - - - - - - - - - - - - - - - pp. 134-141

CHAPTER V.

HUYGENS'S PRINCIPLE.


The Electromagnetic Vector—Determination of Electromagnetic Vector produced by Elementary Waves from any Zone—Determination of Total Effect or Electromagnetic Vector—Expression for Electromagnetic Vector; reduces to Light-Vector for very small values of $\lambda$—Approximate Expression for Electromagnetic Vector-$\lambda$ small—Examination of Approximate Expression for Electromagnetic Vector; Behaviour of same compared with that of Light-Vector. - - - - - - - - - - - - - - pp. 156-163