

# **LIGHTS WAVES AND THEIR USES**

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Lights waves and their uses by A. A. Michelson

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**A. A. MICHELSON**

**LIGHTS WAVES  
AND THEIR USES**



physics  
Optics

# LIGHT WAVES AND THEIR USES

BY  
A. A. MICHELSON  
OF THE DEPARTMENT OF PHYSICS

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## PREFACE

THIS series of eight lectures on "Light Waves and Their Uses" was delivered in the spring of 1899 at the Lowell Institute. In the preparation of the experiments and the lantern projections I was ably assisted by Mr. C. R. Mann, to whom I am further indebted for editing this volume.

I have endeavored, possibly at the risk of inelegance of diction, to present the lectures as nearly as possible in the words in which they were originally given, trusting that thereby some of the interest of the spoken addresses might be retained.

While it is hoped that the work will be intelligible to the general reader, it is also possible that some of the ideas may be of interest to physicists and astronomers who may not have had occasion to read the somewhat scattered published papers.

A. A. MICHELSON.

RYERSON PHYSICAL LABORATORY  
The University of Chicago  
October, 1902





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## LECTURE I

### WAVE MOTION AND INTERFERENCE

SCIENCE, when it has to communicate the results of its labor, is under the disadvantage that its language is but little understood. Hence it is that circumlocution is inevitable and repetitions are difficult to avoid. Scientific men are necessarily educated to economize expression so as to condense whole sentences into a single word and a whole chapter into a single sentence. These words and sentences come to be so familiar to the investigator as expressions of summarized work — it may be of years — that only by considerable effort can he remember that to others his ideas need constant explanation and elucidation which lead to inartistic and wearying repetition. To few is it given to combine the talent of investigation with the happy faculty of making the subject of their work interesting to others. I do not claim to be one of these fortunate few; and if I am not as successful as I could wish in this respect, I can only beg your indulgence for myself, but not for the subject I have chosen. This, to my mind, is one of the most fascinating, not only of the departments of science, but of human knowledge. If a poet could at the same time be a physicist, he might convey to others the pleasure, the satisfaction, almost the reverence, which the subject inspires. The æsthetic side of the subject is, I confess, by no means the least attractive to me. Especially is its fascination felt in the branch which deals with light, and I hope the day may be near when a Ruskin will be found equal to the description of the beauties of coloring, the exquisite gradations of light and shade, and the intricate wonders of symmetrical