

# **SOUND, LIGHT, AND HEAT**

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Sound, Light, and Heat by Mark R. Wright

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**MARK R. WRIGHT**

**SOUND, LIGHT,  
AND HEAT**



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AND  
HEAT

BY  
MARK R. WRIGHT

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*SECOND EDITION*

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## PREFACE.

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THIS volume is an elementary text-book on Sound, Light, and Heat treated experimentally. It is essential that the experiments should be performed. The numerical results which illustrate the text, should not take the place of measurements, made by the student.

The experiments demand no expensive apparatus ; the aim has been to avoid elaborate instruments ; descriptions of the apparatus used, appear in the book or in the Appendix. Many of the engravings are copied from pieces of apparatus in use. The experiment on p. 3 was introduced to English readers by Mr. H. G. Madan.

The results obtained from the experiments make no claim to great accuracy. The student should avoid attaching to his calculations greater value than they deserve ; he should consider the apparatus with which he works ; it is a strong temptation to calculate to five or six places of decimals when probably not more than the first place can be relied upon. The portions of the text, between thick brackets, may be omitted on the first reading.

While attempts have been made to prevent the student forming notions at variance with modern theories, little space has been given to such theories. A beginner's time is best spent in examining the facts of science.

The volume embraces the work usually taken in elementary examinations, such as the elementary stage of the Science and

Art Department, the papers on Light and Heat of the London University Matriculation Examination, and the papers on Heat of the Oxford and Cambridge local examinations.

Numerous examples are given frequently throughout the work ; Science has been slow in copying from Arithmetic in this matter. A large number of the examples are selected from Examination papers ; they include the whole of the questions in the elementary papers of the Science and Art Department, during the last nine years, and the greater proportion of those in the advanced papers.

The usual title, ' Sound, Light, and Heat,' is retained, but ' Heat ' being considered the most suitable as an introductory subject, is placed first in the volume.

M. R. W.

GATESHEAD : *October 1887.*



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# HEAT.

## CHAPTER I.

### HEAT AND TEMPERATURE—THERMOMETERS.

#### I. HEAT AND TEMPERATURE.

TOUCH the part of the fender in front of the fire. It feels warm. The fire-bars feel hot. A piece of iron on the table feels cold. *The agent which produces the sensations of hotness, warmth, coldness, and similar sensations is called Heat.*

Plunge the hand into vessels containing water. The terms hot, very hot, warm, lukewarm, cold, are used to express the state or condition the water is in with respect to the heat that affects the hand.

The names used are names of temperatures.

*The Temperature of a body is its condition with respect to its heat that affects the senses.*

The hand in the last experiment was used to measure roughly the temperature.

*A body that measures temperature is called a Thermometer.*

By using the hand, a table like the following could be constructed :—

*Temperatures.*

—	Very hot	Hot	Warm	Cold	Very cold
Iron	in the fire	near the fire	at the end of the fender	on the table	—
Water	—	boiling	—	spring	in winter.