

**THE ART OF PROJECTING. A
MANUAL OF EXPERIMENTATION IN
PHYSICS, CHEMISTRY AND
NATURAL HISTORY WITH THE PORTE
LUMIERE AND MAGIC LANTERN**

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The Art of Projecting. A Manual of Experimentation in Physics, Chemistry and Natural History with the Porte Lumiere and Magic Lantern by A. E. Dolbear

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A. E. DOLBEAR

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THE ART OF PROJECTING.

A Manual of Experimentation

IN

PHYSICS,

CHEMISTRY, AND NATURAL HISTORY

WITH THE

PORTE LUMIERE AND MAGIC LANTERN.

2nd Edition
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P R E F A C E .

THE object of this treatise is to point out to teachers of physical science, and to others who may be interested in experimentation, the usefulness of the Magic Lantern, and especially of the *Porte Lumière*, and a few other pieces of apparatus which can mostly be extemporized. With these a surprisingly large number of experiments in every department of physics may be performed, and every department of science and art may be illustrated; and the illustrations may be upon a scale of magnitude which will surprise one who has never witnessed them. The manipulation of the apparatus is not at all difficult, and no one need fear he will not succeed in doing anything described in the book, provided that at first he masters the simple conditions of projection with a single lens and with a condenser.

The simplest fixtures have been described, and a cut has been inserted wherever it could make more intelligible either the forms of the apparatus or the necessary conditions. No attempt has been made to explain phenomena, — other books do that; but it is hoped that a sufficient number and variety of experiments are plainly described to make any one thoroughly familiar with the art of projecting.

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THE ART OF PROJECTING.

A **MAGNIFIED** image of a picture, or of any phenomenon, when thrown upon a screen by means of sunlight, and lenses, or with a magic lantern, is called a projection.

When sunlight is to be used for this purpose, it is necessary to have some fixture to give the proper direction to the beam. The *heliostat* and the *porte lumière* are the devices in common use. The latter was the earliest form, and was invented by Gravesand, a Dutch professor of natural philosophy, in the early part of the last century. It was afterwards reinvented by Captain Drummond, an Englishman, who called it the *heliostat*. The latter term is now only applied to an automatic arrangement, by which a mirror is moved by clock-work in such a way that a beam of sunlight reflected from it may be kept in one direction all day, if it be needed so long. Silberman and Foucault have each devised very satisfactory instruments, but they are too costly to be owned by any but the wealthy; the catalogue price of the cheapest of these being five hundred francs. C. Gerhardt, of Bonn, however, makes a small one, carrying a good mirror three inches in diameter, for twenty dollars.