

A Practical Example

It is universally accepted that the speed of light, in a vacuum, is 186,282 miles per second (or 299,792 kilometers per second).

But this standard was not always known. It was estimated by many people over many years, dating back to the 1600s. It wasn't agreed upon by the international scientific community until the 1970s.

One scientist, known for his work in estimating the speed of light, was Albert A. Michelson of the US Navy. In June 1879, he attempted to determine the speed of light using the limited tools that were available to him at the time. Michelson's question was, "how fast does light travel?"

Michelson's research was based on an apparatus developed by Leon Foucault in the mid-19th century. Foucault devised an approach using mirrors set 20 yards apart, reflecting light from a distant source back to an observer.

In the late 1870s, Michelson improved upon Foucault's instruments and set up his equipment over much longer distances. In June and July of 1879, he took a series of measurements over a four-week period on the grounds of the US Naval Academy.

Michelson provided a full account of his investigations in the book *Experimental Determination of the Velocity of Light*, published in 1880. His account includes diagrams of the apparatus and the layout, as well as the raw data he collected from 100 trials.

These data are in the file *Michelson 1879.jmp* in the course materials. We use these data as a case study throughout this module.