PENDULUM: LÉON FOUCAULT AND THE TRIUMPH OF SCIENCE

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Pendulum: Léon Foucault and the Triumph of Science.

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I remember hearing the name Foucault in optics class, but I didn't know anything about him other than having heard about his pendulum experiment. So when I saw this book in

a used book store, I made a purchase to see what I could learn about him. Foucault's life and work is explored in this book, along with background in French history and science history for context. As implied by the title, the emphasis is on his pendulum experiment.

Léon Foucault (1819-1868) lived most of his life in Paris. He suffered from ill health as a child and as an adult. He did not do well in school, but he had great curiosity for the inventions and scientific developments of the day, and he possessed immense skill in designing and constructing instruments. Because he was a self-made scientist without a degree in math or science, many scientists were reluctant to recognize his achievements and he struggled throughout his life for recognition, especially for election to the French Academy of Sciences.

An early interest of Foucault's was photography. He and his friend Hippolyte Fizeau improved the chemical processing in daguerreotype photography. For a while, Foucault studied medicine. After dropping out, he worked with Professor Alfred Donné on microscopy. Foucault

designed an electric light for the microscope to allow the production of daguerreotype photographs of objects seen with a microscope. In 1845, Donné published a textbook, *A Course of Microscopy*, which included 80 daguerreotypes taken by Foucault. Also in 1845, Foucault became the science editor for the newspaper *Journal des Débats* reporting on science to the general public. Around this same time Foucault designed a heliostat which allowed him and Fizeau to take the first photograph of the Sun. Later Foucault built an apparatus which showed that light traveled slower in water than in air.

Foucault's pendulum experiment, put on public display in 1851, showed conclusively that the Earth rotated. The pendulum was designed to swing freely in any direction without human influence. Markings on the floor below it showed that the plane of oscillation of the pendulum moved progressively around in a circle, because the Earth rotated

beneath the pendulum. Foucault predicted that the time required for the completion of a circle was dependent on latitude, which was subsequently proven correct.

Among Foucault's other accomplishments were the design of lighting systems for stage plays and invention of the gyroscope. In 1854, Napoleon III, who admired Foucault's work, created the position of Physicist Attached to the Imperial Observatory for him. Foucault made several telescopes, one of them an 80-inch reflector, still in use at the Observatory of Marseille at the time of the writing of the book. He built a motor to move a telescope counter to the rotation of the Earth, so that it could maintain aim at a given star. He also built a photometer, and in 1860, he traveled to Spain to photograph a total solar eclipse.

In Foucault's later years he started receiving some recognition. He was given a Doctor of Physical Science degree for his study of the speed of light in air and water. In 1862, he was elected to membership in the Bureau of Longitudes and Napoleon III made him an Officer of the French Legion of Honor. The Royal Society in England elected him to foreign membership, and in 1865, he finally became a member of the

French Academy of Sciences. Late in 1867, Foucault started to experience a paralysis which progressed over the next few months until he died early in 1868 at the age of only 49.

I felt that this book was effective in helping to learn about the life of Léon Foucault and context of his times. The author has published several books of popular science and mathematics history.



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