

Eunice Foote

(1819 – 1888)

Discovered the Greenhouse Effect

Main image: Silhouette Female [Stock photo, public domain]
Background: Global Warming [Public Domain]



On August 23, 1856, the Eighth Annual Meeting of the American Association for the Advancement of Science met in New York. A paper, "Circumstances affecting the heat of the sun's rays", authored by Eunice Foote, demonstrated the effects of the sun on certain gases, and theorised how those gases could, or would, interact with the Earth's atmosphere.

In her two-page paper, Foote described filling jars with water vapour, carbon dioxide, and air, and then comparing how much the jars heated in the sun. She described how "carbonic gas" (now called carbon dioxide), had the highest heat-trapping properties. In effect, Foote provided the first experimental evidence demonstrating the Greenhouse Effect. Foote not only described her elegant experiments, but realised their wider significance, noting that *"an atmosphere of that gas would give to our earth a high temperature ... at one period of its history the air had mixed with it a larger proportion than at present, an increased temperature from its own action as well as from increased weight must have necessarily resulted."*

Despite the ground-breaking nature of the work, Foote was not permitted to present her paper and Professor Joseph Henry of the Smithsonian Institution did so in her stead. Further, the paper was left out of the society's annual Proceedings, a published record of the papers presented at the annual meetings.

Three years later, in 1859, Irish physicist John Tyndall published a similar paper that demonstrated the greenhouse effects of certain gases. Until the rediscovery of Foote's paper, Tyndall's work had been widely accepted as the foundation of modern climate change science.

In addition to her scientific work, Foote was a painter, patent attorney and inventor, receiving a patent in 1860 for a "filling for soles of boots and shoes". Together with her scientist husband Elisha, Foote was also an ardent campaigner for women's rights and both she and her husband were part of the Women's Rights Movement, being signatories to the Declaration of Rights and Sentiments in 1848 at the first women's rights convention.

Unfortunately, no image of Eunice Foote is available, perhaps symbolic of the lack of recognition of her work.

