[Episode 12 - Emilie DuChatelet Transcript]

(Smart) My name's Amanda Smart. I'm currently a college student majoring in biophysics. I decided to do a biography on Emilie du Chatelet because of her many contributions to mathematics and physics. Emilie was born in 1706 in Paris, France. Her father was the principle secretary to King Louis XIV. Because of his high-standing, he was able to hire private tutors to come to his home to teach Emilie. By the age of 12, she could read and write in six languages, including Latin, Italian, English, and French. She self-studied moral philosophy, chemistry, physics, mathematics, metaphysics, and experimental philosophy. Emilie was well known for her translations. One of the first was the book called "The Fable of the Bees," by Mindeville, which was a satire on the English economic system. Not only did she translate the book, but she also added her own commentary. She started the preface out with a quote regarding female education during this time. She stated, "I am convinced that many women are either unaware of their talents by reason of the fault in their education or that they buried them on account of prejudice for wont of intellectual courage. My own experiment confirms this. Chance made me acquainted with men of letters who extended the hand of friendship to me. I then began to believe that I was a being with a mind." This quote hit me because she only realized her talents when men did. Messed up! So one of her main contributions to physics was her study of conservation of energy. A fellow scientist during this era was Robin Zanday, who had been running an experiment where he dropped brass balls at various speeds into clay. He realized that the depth of the impacted balls was not linearly proportional to their speeds as Newton had suggested. Emilie reviewed his experimental data and mathematically determined that the energy of the balls was proportional to their mass times their velocity squared. This gave rise to the kinetic energy term that is used today. In 1737, Emilie entered a contest sponsored by the French Academy of Sciences on nature of light, heat, and fire. She submitted a paper known as the Dissertation Sur La Nature Il La Propagation du Froid, which translates to the Nature of Propagation of Fire. In it, she suggested that different colors carry different heating power and anticipated the existence of what is now known as infrared radiation. Although she lost to Euler, her paper was still widely received by the French Academy of Sciences, and was published in 1744. In 1736, Emilie and her good friend, Voltaire -- also, her lover -- co-authored The Elements des la Philosophy du Newton. Although she was not listed as an author due to the controversy of women in sciences during this era, she was heavily acknowledged by Voltaire. He stated that, "He would not have been able to come to the conclusions in the book without her intellectual mind." While Emilie was pregnant with her second son, she worked on a manuscript known as the Foundations of Physie, in which she considered the philosophical basis of science and tried to integrate

the conflicting Newtonian, Cartesian, and Lebanesian views. Emilie had been working on translating Newton's Philosophie Naturalist Principia Mathematica from Latin to French, when she became pregnant at the age of 42. She knew that she was likely to die due to this late life pregnancy, so she started working 18-hour days in order to finish the translation before she passed. Not only did Emilie translate the Principia, she included her own notes, examples, derivations, and clarifications of Newton's explanations. She also explained experiments that confirmed Newton's theories. Two days before she passed away due to childbirth, she finished the translation, which is still the only full translation in French. Emilie was a very lucky female scientist for her time. Due to her father's high-standing, she was able to be educated by some of the most experienced mathematicians of her era and also work alongside them. Even with all this, it was still hard for Emilie to be taken seriously as an intellectual woman in her era by her male counterparts who ruled the scientific world. I am very lucky to be a woman in science today where we do not see the same discrimination against female scientists as we did in 1706. So thanks for tuning in, and I hope you enjoy the podcast. Bye!