

1. Two Firsts: first female astronomer, first evidence of comet crash
2. The field has been dominated by male astronomers since ancient times and not until recently has there been a significant change. Now over 30% of the young astronomers are female. Yet, even with this limitation of access, most astronomers agree that the first female astronomer in written history is Hypatia of Alexandria (c. 350-415 A.D.).  
"Reserve your right to think, for even to think wrongly is better than not to think at all," [Hypatia](#) is credited with saying.  
"To teach superstitions as truth is a most terrible thing."

If you think the image is photograph—you're right. A photograph entitled "Hypatia," by the pioneering 19th-century photographer Julia Margaret Cameron. The model is Marie Spartali. (Image in the [public domain](#).)

3. The life of Hypatia was one enriched with a passion for knowledge. Hypatia was the daughter of Theon, who was considered one of the most educated men in Alexandria, Egypt. Theon raised Hypatia in a world of education. Most historians now recognize Hypatia not only as a mathematician and scientist, but also as a philosopher.

Around 400 C.E. she became the head of the Platonic school in Alexandria, an achievement that in itself is nothing short of astonishing. Hypatia and her father wrote an 11-part commentary on the Almagest, the celebrated astronomy book by Ptolemy, the most influential Greek astronomer of his time. She also wrote explanatory notes on several books in mathematics, most notably Apollonius' Conics and Diophantus's multivolume Arithmetica.

Most historians believe that Hypatia surpassed her father's knowledge at a young age. However, while Hypatia was still under her father's discipline, he also developed for her a physical routine to ensure for her a healthy body as well as a highly functional mind. In her education, Theon instructed

Hypatia on the different religions of the world and taught her how to influence people with the power of words. He taught her the fundamentals of teaching, so that Hypatia became a profound orator. People from other cities came to study and learn from her.

Hypatia's studies included astronomy, astrology, and mathematics. References in letters by Synesius, one of Hypatia's students, credit Hypatia with the invention of the astrolabe, a device used in studying astronomy. However, other sources date this instrument back at least a century earlier. Claudius Ptolemy wrote extensively on the projection used on the plane astrolabe, and Hypatia's father wrote an astrolabe treatise that was the basis for much of what was written later in the Middle Ages. Hypatia did teach about astrolabes as Synesius had an instrument made that was argueably a form of astrolabe.

Hypatia was known more for the work she did in mathematics than in astronomy, primarily for her work on the ideas of conic sections introduced by Apollonius. She edited the work *On the Conics of Apollonius*, which divided cones into different parts by a plane. This concept developed the ideas of hyperbolas, parabolas, and ellipses. With Hypatia's work on this important book, she made the concepts easier to understand, thus making the work survive through many centuries. Hypatia was the first woman to have such a profound impact on the survival of early thought in mathematics.

#### 4. Death of Hypatia

Hypatia lived in Alexandria when Christianity started to dominate over the other religions. In the early 390's, riots broke out frequently between the different religions. Hypatia being a pagan and a highly educated woman was considered decadent by the Christian sects. Cyril, a leader among the Christians spread virulent rumors about her. In 415 AD, on Hypatia's way home, a mob attacked her, stripped her and killed her with pieces of broken pottery. Later, the mob

dragged her through the streets.

## 5. Comet Crash

While we knew that it was likely that a comet had crash on earth, it was not until October 2013 that scientists from South Africa found direct evidence of such a crash

About 28 million years the dirty snowball entered the atmosphere above Egypt, exploded, heating up the sand beneath it to a temperature of about 2,000 degrees Celsius, and resulting in the formation of a huge amount of yellow silica glass which lies scattered over a 6,000 square kilometre area in the Sahara. A magnificent specimen of the glass, polished by ancient jewelers, is found in Tutankhamun's brooch with its striking yellow-brown scarab.

## 6. Mysterious Black Pebble

At the center of the attention of this team was a mysterious black pebble found years earlier by an Egyptian geologist in the area of the silica glass. After conducting highly sophisticated chemical analyses on this pebble, the authors came to the conclusion that it represented the very first known hand specimen of a comet nucleus, rather than simply an unusual type of meteorite.

The mysterious black fragment bears diamonds. "Diamonds are produced from carbon bearing material. Normally they form deep in the Earth, where the pressure is high, but you can also generate very high pressure with shock. Part of the comet impacted and the shock of the impact produced the diamonds."

This stone was named Hyapatia.