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Hypatia

The history of mathematics, and ancient mathematics, is rife with crucial discoveries without which the modern world would likely not be what it is. Ancient men from the enigmatic scribes of Plimpton 322, to Archimedes, Pythagoras, or Euclid, to Newton, have all contributed a great deal. Of course, these mathematicians all had something in common, they were all men. The idea of a female mathematician, much like all other fields, has been foreign until quite recently. In fourth century Roman Alexandria; however, lived one of the first ever female mathematicians, Hypatia. Some of her contributions though not as famous perhaps as those of the above mentioned men, in their own way are important. Furthermore, they may be important based solely on the fact that she was a woman. Hypatia at the time was an unbelievably accomplished woman, in many ways this seems to be the very tragedy of her life. Her success, and following, likely caused the confrontation that replaced the fame of her scholarship, with the notoriety of her death.

Much of Hypatia’s story is discovered with an understanding of where she comes from. As mentioned above she was born in Alexandria. Up until about 30 A.D. Alexandria had been under Greek influence as a result of Alexander’s conquest of the region over 300 years before. It was in that year though that Alexandria came under the authority of Rome. Fortunately, the already established “Alexandrian Museum,” which was essentially a university for the ancients remained mostly intact.[[1]](#footnote-1) Hypatia herself was born somewhere between the years 350 A.D. and 370 A.D[[2]](#footnote-2) to Theon. Theon himself was a great mathematician and widely considered the last head of the Alexandrian Museum. In Hypatia’s age, Alexandria would have had a strange amalgam of culture, and religion. In basic terms, this meant there was a rapidly augmenting early Christian population, that in some senses was consuming the Paganism that was itself natural, or at least well-established, to the land. Christianity’s prominence was so quickly developing in Egypt that some of the first monastic communities sprung up around 300 A.D.[[3]](#footnote-3) What is fascinating is that the attraction to this lifestyle was twofold. Firstly, it was considered an “escape from overly harsh taxation and frequent attacks by invading armies;”[[4]](#footnote-4) and secondly, “it was a new way to be a Martyr for God.”[[5]](#footnote-5) Needless to say, the result of this was possibly something similar to Christian hysteria.

It was in this environment that Hypatia learned her mathematics. It is expected that much of this knowledge or at least the basis of her knowledge came from her father, whose own contributions were no small feat. Among other things Theon’s body of work included several commentaries on various works from Hellenistic mathematicians. Most famously he wrote a commentary on Euclid’s *Elements*. Hypatia herself would edit her father’s *Elements* and some of his other works.

This does not mean; however, that Hypatia’s contributions to mathematics or knowledge were by any means inconsequential. In fact, in some cases quite the contrary. It is not unlikely that she in fact surpassed her father’s abilities.[[6]](#footnote-6) Among her works it is indisputable that she, “wrote a Commentary on Diophantus, [one on] the astronomical Canon, and a Commentary on Apollonius's Conics.”[[7]](#footnote-7) She is probably most famous though for her hydroscope or hydrometer. This instrument of course was used to measure density. In fact, her student Synesius (perhaps among others) requested she make one for him.[[8]](#footnote-8) Another field she was famous for though, was her teaching, and her philosophy.

Hypatia was a learned woman whose depth went beyond mathematics, and included what then would have been thought to be a complementary field; philosophy. Accordingly, she taught both of these subjects with expertise in such a way that attracted many students and admirers. It is well known that she was a “Neo-Platonist” and thusly much of her teaching was concerned with the Theory of Forms with a sort of religious bent.[[9]](#footnote-9) Either way it is know that, “In about the year 400 A.D. she became head of the Neoplatonic school in Alexandria,” suggesting her authority in the field. Of course, what was likely the most unusual aspect of her story was that she even attracted many prominent men to her lectures, and it was not just for her beauty.[[10]](#footnote-10) One of the most famous of these was Synesius of Cyrene, later to become See of Ptolemais.[[11]](#footnote-11) Synesius though not much of a mathematician per se was quite a well known philosopher. His works include a treatise “On Dreams” and a speech “On Imperial Rule.” He had “unbounded enthusiasm for Hypatia, his ‘master.’ ‘mother,’ ‘the Philosopher...’ To some extent his enthusiasm for philosophy itself and for the schools of Alexandria may have been the offspring of his spiritual infatuation with the person of Hypatia.”[[12]](#footnote-12) If Synesius was anything like Hypatia’s other students it is safe to say that she was indeed quite popular. Unfortunately, her teachings are not all that are remembered of Hypatia.

Beyond mathematics, philosophy, and reverence as the first female mathematician, Hypatia is remembered today largely because of her untimely, and gruesome death. As mentioned above, Alexandrian was Christianizing fanatically and with celerity. In this atmosphere there was a general sense of intolerance. Often, St. Cyril the Bishop of Alexandria is justly blamed for her death, but to understand the situation fully a third character must be introduced, Orestes. Orestes was the Roman Prefect or governor of Alexandria, though he was a Christian he was not a fanatic and in fact was quite tolerant of other religions.[[13]](#footnote-13) St. Cyril, on the other hand, is known for being intolerant. Derkset points out that Cyril was in “pursuit of a monkish holy war.”[[14]](#footnote-14) These two figures constantly clashed, largely because they both sought similar political powers. In fact, Orestes opposed Cyril’s rise to the patriarchate.[[15]](#footnote-15) To make matters more extreme Cyril had essentially six hundred Parabolani, monk-soldiers, at his command ready to wage wars against non-Christians.[[16]](#footnote-16) This rivalry likely only intensified Hypatia’s dire situation when St. Cyril decided to turn against her. St. Cyril was fundamentally against Neo-Platonism, and thus its leader made an excellent target for the Parabolani.[[17]](#footnote-17) Despite the fact that Hypatia had many Christian supporters including Orestes and Synesius, she was attacked by a Christian mob made up of the Parabolani and others. Though it is not entirely sure how she died most accounts are quite gruesome. One says that during, “Lent in 415 the Parabolani dragged Hypatia from her chariot, stripped her, murdered her with roofing tiles, and then burned her dismembered body.”[[18]](#footnote-18) Another, “brutally hacked to pieces, at the hands of a Christian lynch-mob.”[[19]](#footnote-19)

Though there is not much information about her life filmmaker Alejandro Amenabar chose to make a “historical movie.” The film, like many others of its genres, used its fair share of poetic license. For example, many of the characters may either have been irrelevant, or their personalities embellished in untrue ways. Specifically, the romantic plots between Hypatia, and Orestes is probably mostly a result of speculation on the part of the film’s writes. Furthermore, if the film’s character Davus existed at all, the pivotal role given to him in the movie is probably unrealistic. Another aspect of the film that would be difficult to prove is Hypatia’s quest to discover the movement of what she calls the “wanderers.” Though it is known that she was indeed quite an astronomer, not only do none of her works survive, but also it cannot be proven that she really thought about this issue so devoutly, or that she would have come to the conclusion that the earth was part of a heliocentric system. The great strengths of this move are exhibited in the capturing of the tensions between the various religions, and the tensions between Christianity and science. Though, once again, it cannot be certain that the Parabolani raids happened quite the way they did, the tension between them, the pagans, and the Jews, is very realistic. The great “take-away” of the film, from this perspective, is a sort of reminder of the dangers of fanaticism, while at the same time it does not preach some type of ethical relativism. Another fortunate part of the film, though again likely inaccurate, is the death of Hypatia. Luckily for the audience, rather than depicting a horribly gruesome death, the filmmakers chose a somewhat romanticized version.

The final question then is, what does Hypatia mean to the modern world and modern people? Unfortunately, though we have an idea of her specific contributions to mathematics and philosophy, none of her works survive. What does survive however is a legend, that may have fictitious elements, which do not make it any less important. When one simply searches “Hypatia” one finds dozens of journals on feminism that have taken her very name as a symbol. Ultimately, it can be concluded that the story of Hypatia’s life is essentially revolutionary. She changed intellectual history.

1. Deakin, Michael A. "Hypatia and Her Mathematics." *The American Mathematical Monthly* 101.3 (1994): 234-43. Print. [↑](#footnote-ref-1)
2. Dzielska, Maria. *Hypatia of Alexandria*. Cambridge (Massachusetts): Harvard UP, 2002. Print There is some debate over this date. Deakin suggest that it is more likely that she was born around 370 A.D. and not 350 A.D. (4). [↑](#footnote-ref-2)
3. Derksen, John. "Why Did Early Christians Turn Violent? The Case of Early Egypt." *Theological Review* 31 (2010): 60-91. Print. (1). [↑](#footnote-ref-3)
4. IBID (1). [↑](#footnote-ref-4)
5. IBID (1). [↑](#footnote-ref-5)
6. Deakin. (5). [↑](#footnote-ref-6)
7. IBID. (6). [↑](#footnote-ref-7)
8. IBID. (9). Deakin also points out that there is some scholarly debate as to whether or not it was in fact this type of Neo-Platonism that Hypatia lectured on. [↑](#footnote-ref-8)
9. IBID. (5). [↑](#footnote-ref-9)
10. IBID. (5). Deakin says that not only was Hypatia learned but she was beautiful, and celibate. [↑](#footnote-ref-10)
11. "Synesius of Cyrene." *Livius. Articles on Ancient History*. Web. 09 Dec. 2010. <http://www.livius.org/su-sz/synesius/synesius\_cyrene.html>. [↑](#footnote-ref-11)
12. Pando, José Carlos. *The Life and times of Synesius of Cyrene as Revealed in His Works,*. Washington, D.C.: Catholic University of America, 1940. Print. [↑](#footnote-ref-12)
13. Deakin. (3) [↑](#footnote-ref-13)
14. Derksen. (24) [↑](#footnote-ref-14)
15. IBID. (24) [↑](#footnote-ref-15)
16. IBID (24) [↑](#footnote-ref-16)
17. “Rist does toy with the idea that her mathematical activities were a partial cause, hypothesizing that these included astrology.” Deakin (4) [↑](#footnote-ref-17)
18. IBID (24) [↑](#footnote-ref-18)
19. Deakin (3). [↑](#footnote-ref-19)