

Tribute

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Nothing expresses this religious fervor quite so aptly as the murder of Hypatia – the first documented female mathematician-philosopher.

In 415 A.D., a band of Christian monks seized Hypatia on the street, beat her, dragged her body to a church, mutilated her flesh, and burned her remains. John, Christian Bishop of Nikin approved of the murder because she was connected to “magic, astrolabes and instruments of music” – all pagan activities in the eyes of the church. The end of the revival of Greek mathematics happened with the death of a woman!

Even though in the 5th-7th centuries A.D., there were actually documented “double” monasteries that included men and women, by the 8th century, Charlemagne’s decrees signaled the greatest barriers to women in the church and in science for the next thousand years. Charlemagne abolished gender equity, requiring monasteries to teach only in Latin and only to chaste men. In the 13th century, “mathematical” priests like Bishop Robert Grosseteste and his student Roger Bacon merged Science – the study of Nature – with the church. In 1543, Parliament banned women from reading the Bible. The Church systematically linked women to “magic,” rebellious sects, paganism, heresy and witchcraft. Women were banned from universities.

Despite being denied all access to formal education, enter the resilient 17th century female astronomers – a lineage of women born after 1600 who looked to the sky – after all, no one owned the stars!

Sophie Brahe assisted her brother Tycho Brahe with his celestial observations. Maria Cunitz, known as the “Second Hypatia” wrote the book *Urania Propitica*, simplifying Kepler’s planetary tables – but no one believed it was her book. Margaret Cavendish had no formal education, yet wrote six books on natural philosophy. In 1667, she was invited to one meeting of the Royal Society, but was never invited again.

Maria Winkelmann, the most famous mathematical woman of her time, discovered a comet, yet was denied both credit and a university position and was eventually banished from even entering the observatory – quarantined in her own home! Gabrielle-Emilie Chatelet supplied mathematical expertise to Voltaire for his book, then wrote her own book on Newtonian physics – a book her tutor claimed to have written – published anonymously after her death.

Maria Angela Archinghelli translated the works of Newtonian physicist Stephen Hales into Italian and was so accomplished, her mentor urged the Paris Academy of Sciences to accept her as a member. Instead, they would only accept a portrait of her.

Laura Bassi, educated at home, became the world’s first woman professor in 1723. A mother of eight, Bassi defied university policies, offering classes in her home and was appointed Chair of Experimental Physics, with her husband serving as her assistant. Yet the “philosophess” was always cited for her circumstances, not her ideas or accomplishments. Maria Gaetana Agnesi, a brilliant

mathematician who loved cloistered solitude, wrote two books – one on natural philosophy and one on differential calculus – but as a female was not allowed the freedom to be a “mathematician-monk.”

Wertheim concludes her “gender wars” history by arguing against the quasi-religiosity of elitist “physicist-priests” – like Einstein and Hawking – who claimed physics was transcendent and “ethically neutral” because it sought to unravel the “Mind of God,” promoting the idea that mathematical “science” and “femininity” were polar opposites. For Wertheim, gender equity was more important than entitlement. It was an ethical question of grounding physics in social responsibility and moving it towards a global balance – because women are acculturated differently, they also see and interpret differently.

Wertheim: “After two and a half thousand years, the time has come for Mathematical Man to embrace the partnership of Mathematical Woman. The time has come for a mathematically based science envisioned and practiced equally by both sexes.”

Wertheim put her money, time and enthusiasm where her beliefs were. In 1997, Wertheim left physics entirely. She and her twin sister Christine founded the Institute for Figuring (IFF) – in order to create an entirely new, cross-disciplinary, ethically-minded project – the Hyperbolic Crochet Coral Reef.

In 1997, Cornell mathematician Dr. Daina Taimina solved a mathematical puzzle that had plagued mathematicians for decades – a way to create a resilient model to study hyperbolic geometry. Noone could come up with a formula. Paper models tore, could not be manipulated and did not last. Taimina, a knitter, decided to try yarn, and discovered that the crochet stitch – in all its infinite algorithmic possibilities – perfectly demonstrated the infinite possibilities hidden in hyperbolic geometry.

Concerned about the perils facing the Great Barrier Reef that stretches along the massive coastline of their native Queensland, Australia, Margaret and Christine Wertheim merged higher geometry and feminine hand-craft and crocheted a coral reef. A project that began on their living room coffee table has taken on a world renowned persona of its own – through installations in museums and every imaginable venue around the globe. In 2011, when the Smithsonian Institution hosted an exhibition of the Hyperbolic Crochet Coral Reef, Science Curator Nancy Knowlton observed: “The reefs I studied 35 years ago have largely vanished, and most reefs may well be gone by the end of the century, or sooner if nothing is done to protect them.”

The Wertheims took action. Their Hyperbolic Crochet Coral Reef tells the story of coral reefs – their beauty intertwined with the perils they face. The project is a clear testament to how art – combined with science – builds community, forming a much wider swath of influence – like that fleeting solar eclipse crossing the entire country in just one hour but impacting millions.

What a triumphant story about mathematical woman. Happy spring!

D. Quincy Whitney is a career journalist, author, historian and Nashua resident of more than 40 years. Contact Whitney at quincysquill@nashuatelegraph.com.

