

GENIUS, *thy name is* WOMAN

by Thea Fiore-Bloom

When the majority of civilization prohibited women from poking a satin-slipped toe inside a lecture hall (let alone graduate), Italy engaged female physicians and professors to instruct female students in the latest methods in eye surgery. From the late 11th to the early 19th century, Italy's attitude toward educating women in medicine was one of the most advanced in the world.

Ten female Italian geniuses collectively cut a Milky Way-like swath through the firmament of science. Yet, few of us actually know about these women. We begin in the Middle Ages and end in 2015.

If you were a woman who longed to practice medicine in the late 11th century, your dream destination would have been southern Italy. Here you could have joined the Salerno School, part of the medical renaissance stirred by the arrival of Latin translations of Islamic and Greek medical texts to the shores of Sicily and North Africa. In Salerno you might have studied under a famous female physician. ...

Trotula of Salerno (late 11th-12th century) was an expert diagnostician and clinician specializing in women's ailments. The medieval trio of seminal medical texts said to be named for her, *The Trotula*, contain the actual teachings and writings of Trotula, an expert in the then perplexing treatment of birth complications.

But what would a medically inclined woman like you do after the eventual decline of the Salerno School, around the early 1300's?

Perhaps you hocked your trousseau



Maria Montessori



Rifa Levi-Montalcini



Margherita Hack



Laura Bassi

and rode to Northern Italy to study at one of Europe's most prominent institutions of learning that accepted women. If you were the cream of the crop, you entered the University of Bologna, where women and science were reaching unprecedented heights in the Western World. There you would hear tales of a Persiceto-born lady anatomy professor. ...

Alessandra Giliani (1307-1326) began her career as surgical assistant to Mondino de Luzzi. Giliani garnered fame for being the only known female "qualified prosecutor" (nowadays pathologist) in Europe at the time.

It was Giliani who purportedly invented a method (now lost to history) of replacing cadaver blood with dyes to bet-

ter observe the intricacies of the human circulatory system. A plaque detailing her contribution to medicine exists in the church of San Pietro e Marcellino in Rome.

If you attended the University of Bologna in the 1400s you might have studied under a noted Neapolitan physician, philosopher and professor. ...

Dr. Dorotea Bucca (1360-1436) held both the chairs of medicine and philosophy at that University for forty years (1390-1430). Few records remain of Bucca's work.

Come the 1600s, you might have headed to Venice to pursue your studies at the University of Padua to be close to a nascent star. ...

Mathematician and polymath **Elena Cornaro Piscopia** (1646-1684) has been compared to Leonardo

DaVinci. Before the age of 11 this "prodigy of Venice" dazzled audiences with pyrotechnic displays of genius in math, music and astronomy and in six languages.

Around 1677, Piscopia astonished her University of Padua doctoral examiners by breezing through every arduous examination question tossed her way. In 1678, more than 20,000 spectators crowded in to Padua Cathedral to hear Piscopia's lecture and see her crowned with laurel to become the first official female doctorate.

Like many of our stellar 10, Piscopia decided against marriage and children in order to pursue her research. Not so for an 18th-century physicist from Bologna. ...

Physicist Laura Bassi (1711-1788)



▲ FABIOLA GIANOTTI

A top particle physicist, she is among 10 Italian women who have set the scientific world ablaze over the centuries.

played a crucial role in the introduction of Newtonian physics to Italy while rearing eight children. Bassi published 28 articles on physics, irrefrangibility and hydraulics during her tenure as professor at Bologna's University. And in 1745 the pope elected Bassi to an elite roundtable of scholars known as the Benedettini.

From then until her death in 1788 she taught experimental physics and electricity at the Institute of Sciences where her fellow researcher and husband, Giuseppe Varetti, was her teaching assistant.

If your dreams were mathematical in nature, another famous 18th-century Italian science author would have been an ideal mentor for you. ...

Algebraist, geometer and logician **Maria Gaetana Agnesi** (1718-1799) is often referred to as the most important female mathematician since the 5th century's Hypatia. In 1748, Milanese Agnesi published the first book that addressed both differential and integral calculus. Agnesi wrote so comprehensively and accessibly of her own theories and those who came before her, she rocketed to fame throughout Europe.

If you dreamt of blooming as a scientist in the post Bassi-Agnesi era, you might have been out in the cold. The 1800s imposed strongly defined gender roles that effectively barred women from enjoying formal scientific education. It would take WWII to disrupt the suppression, but Italy still managed to produce innovators in the late 19th century. ...

Maria Montessori (1870-1952) was a

math prodigy, scientist, physician and philosopher from Chiaravalle who traveled the globe to promote a science-based pedagogy she invented that encouraged independent thinking and changed the nature of childhood education forever.

The Montessori method was built upon years of research the doctor conducted with children in Rome's San Lorenzo district. Larry Page and Sergey Brin (creators of Google), along with Amazon's Jeff Bezos, credit their inventiveness to their Montessori education. Montessori also traveled the world to advocate for an end to war. In fact, she was thrice nominated for the Nobel Peace Prize.

The 1986 Nobel Prize winning neurologist **Rita Levi-Montalcini** (1909-2013) was a Turin born Italian-Jewish doctor who defied Nazi imposed racial laws to advance science.

Levi-Montalcini's and Stanley Cohen's research resulted in the discovery of Nerve Growth Factor, a chemical vital to science's understanding of cell growth and organ regeneration. Though her contributions were ignored for decades prior to the Nobel Prize, Levi-Montalcini's discovery has now been acknowledged as a key to unlocking cures to Alzheimer's, Parkinson's and cancer.

Levi-Montalcini was an icon of vibrancy until her death at 103. This presidentially appointed "Senator For Life" and mentor of young women scientists was also known for her elegant, ever-coiffed hair.

In contrast to the silk clad Levi-Montalcini, astrophysicist **Margherita Hack** (1922-2013) wore an overcoat-turned-inside out for her bridal gown. The globally recognized scientist enjoyed relating to reporters that her "first and last" appearance in church was in 1944 to marry childhood playmate, Aldo De Rosa (to whom she remained wed for 70 years).

This full professor of astronomy at the University of Trieste (1964-1992) was a stellar astronomer, contributing to the spectral classification of stars. Her bold piloting of the Trieste Astronomical Observatory (1964-87) resulted in global recognition for the institution.

The outspoken vegetarian and atheist's impish wit and confident ability to explain complex theorems in a down-to-earth way made her a popular author and guest on Italian television debates. Among other awards, Hack was designated "Dame Grand Cross of the Order of the Italian Republic," though the astronomer's favorite honor was probably having an asteroid (8558 Hack) named after her.

While Florentine Margherita Hack was receiving the Grand Cross in 2012, Roman Fabiola Gianotti was declared runner-up to Barack Obama as Time Magazine's "Person of the Year." ...

In 2012, top experimental particle physicist **Fabiola Gianotti** (1960-) announced to the world that her Hadron Collider team of thousands at CERN had discovered the elusive Higgs boson. Scholars maintain the recent isolation of this subatomic element "completed the standard model of particle physics."

Fermilab's director Nigel Lockyer stated, "Fabiola is a superb scientist, led ATLAS to a great discovery and is respected and well known around the world." In fact Gianotti will become the first woman director of the whole of CERN in January 2016.

Gianotti is well aware of the current disparity of women to men in the sciences but insists: "In the future we will have to be very vigilant that young female scientists have the same opportunities as their male colleagues."

So take note, if you are a woman in the 21st century who longs to study science, your dream destination may once again be Italy.