

Nettie Maria Stevens, Ph.D.

By GEORGE ADAMS PARKHURST

It was just 75 years ago that a local woman achieved international fame for a discovery in the field of genetics and sex determination. Nettie Maria Stevens, a descendant of one of Chelmsford's original families, announced to the scientific world that sex difference, at least in beetles, resulted from the presence of XY or XX chromosomes.

Nettie traced her ancestry back to Richard Hildreth, whose 1693 grave is the third oldest that has been identified in Forefathers' Burying Ground behind the First Parish Church. Elizabeth Hildreth, the eldest daughter of Richard and his second wife, married Ensign John Stevens in 1664 and they settled on a farm at the foot of Frances Hill on what was then Stony Brook path but is known as Old Westford Road today. Five generations of the Stevens Family cultivated this farm located near the junction of Old Westford Road and School Street.

Several generations later one branch of this family was living in Cavendish, Vermont where, on July 7, 1861, a daughter, Nettie Maria, was born to Ephraim Asa and Julia (Adams) Stevens.

Sometime later the Stevens left Cavendish and returned to Westford where Nettie received her early education, graduating from Westford Academy with the Class of 1880. In 1892, at the age of thirty-one, she entered the Normal School at Westfield and four years later she crossed the continent to California and enrolled at Leland Stanford University, majoring in physiology. She received her A.B. degree in 1899 and an A.M. the following year. She spent the year 1899-00 studying experimental physiology, histology, and cytology. Valuable practical experience was acquired at the Hopkins Laboratory in Pacific Grove, California during her four summer vacations of 1897-00.

In the fall of 1900, Nettie entered Bryn Mawr College as a graduate student in biology. The following March she was awarded the President's European Fellowship and, after spending the summer months at the Marine Biological Laboratory at Woods Hole on Cape Cod, she traveled to Italy where she occupied the American Woman's Table at the Naples Zoological Station. That summer she studies at the Zoologisches Institut in Würzburg, Germany, returning in the fall to Bryn Mawr as a Resident Fellow in biology and received her Ph.D. degree in 1903 with a thesis on ciliate protozoa.

Dr. Stevens continued her work in biology and

morphology at Bryn Mawr and, in 1904, was awarded a \$1,000 grant in aid for research by the Carnegie Institute of Washington and the following year she received the \$1,000 Ellen Swallow Richards prize for her paper, "A Study of the Germ Cells of *Aphis rosae* and *Aphis oenotherae*."

The Encyclopedia Americana describes her most important discovery: "The connection of an unequal pair of chromosomes to sex difference was first established in a beetle by the American cytologist Nettie M. Stevens in 1905. Stevens showed that males had unlike members in one chromosome pair called XY, while females had like members called XX." Her work was corroborated by another cytologist, Edmond B. Wilson, working independently at the same time.

Working with the beetle *Tenebrio molitor*, Dr. Stevens found that the male produced two kinds of sperm, one carrying a large X-chromosome and the other a small Y-chromosome. The unfertilized eggs, however, were all alike in possessing two X-chromosomes. She inferred that an egg fertilized by an X-carrying sperm produced a female embryo while the Y-sperm produced a male.

In 1909 Nettie returned to Germany for further study under her previous mentor, Professor Theodor Boveri.

Three years later she developed breast cancer and entered Johns Hopkins Hospital in Baltimore where she died on May 4, 1912 at the age of 50. Her death was a great loss, not only to her family and friends, but also to the academic and scientific world. Her survivors included a sister, Emma, and her father who had retired in California. Her funeral was held in Westford and she was buried there in Fairview Cemetery.

During her comparatively short career, she published nearly 40 professional papers. It is reported that Dr. Stevens was known for her clarity and brevity and was known as a woman of strong will, enormous drive, precise and persistent in pursuit of her goals. Her life was almost exclusively dedicated to teaching and scientific research. However, before embarking on her scientific career, Nettie lived in Chelmsford for a while and served as librarian of the Free Public Library, the predecessor of the Adams Library.

It is quite conceivable that, had her career not been cut short by cancer, Nettie Maria Stevens might have been a recipient of a Nobel Prize.



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