Women in natural history

Mary Treat and her traps

By **Dawn Sanders**, education consultant, The Charles Darwin Trust

From an early age, I enjoyed putting dead flies and numerous plant parts under my microscope. As an adult this interest has evolved into a passion for carnivorous plants. In discovering the scientific work of Mary Treat (1830–1923), botanist and entomologist, I have found a kindred spirit written into the folds of history.

Mary Lua Adelia Davis was born on 7 September 1830 in Trumansville, New York, USA. In 1839 her family moved to Ohio. Mary married Dr Joseph Burrell Treat in 1863 and in 1869 they moved to Vineland, New Jersey. After separating from Joseph in 1874 Mary supported herself by publishing popular science articles for periodicals such as *Harpers and Queen*. Her first scientific article was a note published in *The American Entomologist* when she was 39 years old. Over 28 years Mary wrote 76 scientific and popular articles as well as five books. Her book, *Injurious Insects of the Farm and Field,* originally published in 1882, was reprinted five times. She also collected plants and insects for other researchers, one of whom was the eminent Harvard botanist Asa Gray. It was through Gray that Mary was introduced to Charles Darwin.

Mary Treat's association with Darwin was mainly centred on observing carnivorous plants and discussing their ability to trap and digest insects through a variety of means. Treat was so passionate about this she spent many late nights bent over her microscope watching microscopic animals enter the minute underwater traps of *Utricularia clandestina.* Darwin had mistakenly thought the animals used their heads as wedges to enter the slit-like orifices. Mary, through long hours of observing the trapping sequence, had realised the hairs around the entrance to the trap were sensitive and part of the process. Writing about her observations in the *Gardener's Chronicle* she described these traps acting like 'so many stomachs, digesting and assimilating animal food'. In a letter to Mary, Darwin wrote that the problem of the *Utricularia* traps had driven him 'half-mad'. He was so impressed with her work on these plants that he referenced her throughout his publication *Insectivorous Plants* (1875).

Like Darwin, in his later life, Mary used her home and garden as a living laboratory. She wrote at length about her 'insect menagerie', an area in her garden where she spent long periods observing ants and spiders actively encouraging them to set up home by creating nooks and crannies for them to live in. She was so fond of studying spiders she constructed temporary cases in large specimen jars, while she continued her observations. Conscious of the sensibilities of female visitors Mary made floral features a focus:

'I capture spiders for investigation by cutting out the nests with a sharp trowel or large knife, and have ready some glass candy jars from 12 to 14 inches in height, in which I carefully place them. I then fill in with earth all around... and cover the surface with moss, introducing some pretty little growing plants, so that my nervous lady friends may admire the plants without being shocked with the knowledge that each of these jars is the home of a spider.'

Writing in *Home Studies in Nature* she stated that, 'The smallest area around the well-chosen home will furnish material to satisfy all thirst of knowledge through the longest life' (1885).

Although Mary mainly worked in her garden and parlour she made regular forays in a 15-kilometre radius around her home in Vineland, New Jersey and went to Florida for her winter holidays. As well as corresponding with Asa Gray and Charles Darwin she exchanged letters with the entomologists Auguste Forel and Gustav Mayr. As an author she did not always publish alone, she co-authored *Through a Microscope* with Samuel Wells and Frederick Sargent, a book in which she emphasised the importance of the microscope for observing nature.

Her love of observing and recording the details of carnivorous plants finds her, on Christmas day in 1885, producing the following entry for *Home Studies in Nature:*

'On 25 December I placed tiny bits of raw fresh beef on ten leaves of *P. pumila.* In six hours the secretion was so copious that the spoon-tipped ends of seven leaves were filled. The secretion had mingled with the juice of the beef and looked bloody, but the meat itself was white and tender. In a little less than twelve hours the fluid had changed colour; it now looked clear, and remained so until it was gradually absorbed.'

Charles Darwin corresponded with Mary more than any other woman scientist. Mary's contributions to botany and entomology

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were extensive. Several species of spider, an ant, fern and lily were named after her. She also put forward several theories, which have since been proven to be correct, one of these being that nectar secreted by sarracenia plants (a form of carnivorous plant shaped like a pitcher) contains an intoxicant that affects the ability of flies to move. She was one of four American women botanists publishing before 1880 and was the most well-known and prolific of this group. Today Mary Treat is relatively obscure, many modern books on Darwin omit their correspondence and to date no extensive biography of her life and work has been written. The best introduction available is the chapter 'Spiders, Ants and Carnivorous Plants: Mary Treat and evolutionary science' in Tina Gianquitto's recently published book *Good Observers of Nature.*

I have been researching Treat's life and work for several years now, the highlight of which has been an afternoon spent in the Vineland Historical Society, New Jersey where there is a fairly extensive correspondence archive, including this note to Mary in 1876 from George Thursten, Editor of *American Agriculturalist,* 'I am glad that you are industriously investigating insectivorous individuals (how's that for alliteration?)'

Unlike Darwin, nothing remains of Mary's house or garden, but in the archive at Vineland, the herbarium at Harvard and in her many publications her scientific legacy survives.

Bee feeding on an insect eating pitcher plant © Frank Boellmann