

Charlotte Nichols Saunders Horner, trailblazing botanist

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While little known within today's botanical community, Charlotte Nichols Saunders Horner (July 5, 1823 - July 18, 1906) was among the most highly accomplished American botanists of her time. Active during a fertile period for botany, this adventurous woman rose to become an expert on the plants of the Northeast United States and Colorado. She was one of only a handful of women in the Northeast United States to publish in scientific journals during this period, the first woman to give a scientific talk for the Massachusetts Horticultural Society which had been active for more than 50 years, and the first person to be awarded its silver medal for native plants. An active collector for longer than 30 years, more than 1300 of Horner's herbarium specimens still exist and add value to more than a dozen scientific collections. Unusually for a woman of her time, she was paid for her expertise through her highly successful academic botanical supply business. Charlotte Horner's contributions continue to influence science at an international scale.

MILITARY FAMILY AND BOXFORD CHILDHOOD

Charlotte Nichols Saunders Horner (née Morse) was born in Boxford, Massachusetts to Mary (née Parker) and Samuel Morse, a veteran of the War of 1812 (Perley 1893). She was the eldest of eight siblings, the youngest of whom was born when Charlotte was 22 years old (FamilySearch 2022b). Hers was a highly regarded military family; her father, grandfather, brothers, and the four cousins who shared their home were all military men (Georgetown Advocate 1878a, 1881b). The best known of her siblings was Henry M. Morse, Civil War soldier and outstanding hunter recognized across the west as “Yankee Hank, the Guide” for taking visiting parties to view the scenery of Colorado (Chapman Publishing Company 1899). Another brother, Herbert C. Morse, was in the 12th Massachusetts Infantry and died at the age of 24 during the Civil War in the infamous Libby Prison (FamilySearch 2022a).

During Charlotte's childhood, Boxford was a small farming community of fewer than 1000 residents (Perley 1880). Charlotte grew up in an “unpretentious ... small” one-story cottage built by her maternal grandfather in 1799 on a road from West Boxford to South Groveland (Georgetown Advocate 1878a; Perley 1884).

EDUCATION AND EARLY INTEREST IN BOTANY

Charlotte's botanical education began decades before the rapid expansion of such opportunities for girls and women following the Civil War (Rudolph 1982) and the concomitant popularity of botany as an educational pastime. Her exceptional enthusiasm for her field of study since childhood has been a hallmark of women scientists across the decades and around the world (Byrne et al. 2018). She began her formal study of botany under the instruction of Miss Eveline Reynolds at a private school in West Boxford, (Georgetown Advocate 1892; Horner 1881). Reynolds taught Charlotte about “the great Linnaeus” but strongly emphasized the importance of field study in addition to books for the development of botanical expertise. This exhortation made a strong impression on Charlotte; she credited field study as the source of the greater part of her botanical knowledge. Throughout her life she learned about botany from people who, like her brother, Henry, acquired their expertise in natural history through less formal means. She wrote, “There are those who walk the Earth open-eyed, and to such nature reveals herself, as she does not to the careless traveler, and as in times past I have been indebted to the woodcutter and the sportsman for knowledge of the haunts of rare flower or tree,

so now I say that all such hints will be most welcome” (Horner 1876b).

TEACHING CAREER, MARRIAGE, AND BOTANICAL SUPPLY BUSINESS

At the age of 16, Charlotte became teacher at the Pond School in North Andover, Massachusetts. Two years later, she returned to teach in West Boxford. By the age of 20, she was teaching at West Boxford’s “old Red Schoolhouse,” which is no longer standing (FamilySearch 2016; Georgetown Advocate 1924), and had become engaged to William Spofford Horner. They married after a ten-year engagement (Georgetown Advocate 1924; Massachusetts: Vital Records 1841-1910 (From original records held by the Massachusetts Archives) 1853). Of the 1454 women botanists from this period identified by Rudolph (1990) fewer than one-third were married.

After marriage, the Horners took up housekeeping in a newly built house on land purchased by William in 1848 in nearby Georgetown Center (Comiskey 2017). The property included William’s shoe shop. Their home was a busy one. Many people lived with them at various times including William’s parents, his younger sister, Sarah Horner, who was a well-known teacher, Charlotte’s brother, Edwin, Henry’s son, Elvin, and a 16-year-old domestic worker, as well as William’s apprentice and his store clerk, a flag man, a farm worker, and a boarder (Comiskey 2017; Grover and Larson 2017). William became a station master for the Boston & Maine Railroad at the Georgetown Depot in 1865 (Georgetown Advocate 1890b, 1890c; Sammarco 2002). Charlotte assisted him with “fortitude” in all aspects of this “arduous” job which included handling switches every day for more than 25 years except for sick days and one vacation.

William was described as kind and witty, a romantic with a wonderful tenor voice, who fed, housed, and employed the poor. He was also an active community member who always voted in favor of progress and equal rights. Moreover, he “was as fond of flowers as a woman. He followed the procession of wildflowers through the season, bringing home in triumph the first hepatica, orchis, cardinal flower, etc. This feeling doubtless increased by his interest in Mrs. Horner’s botanical pursuits, by helping her to the specimens with which she supplied the Boston schools” (Georgetown Advocate 1898b).

Indeed, at a time when women were mainly excluded from professional botanical pursuits, Horner found a way, other than teaching children and the sale of herbarium specimens (Cassino 1895), to be paid for her expertise: her own botanical supply business. She provided botanical specimens to Massachusetts high schools and perhaps Harvard College (Georgetown Advocate 1886, 1892, 1924; Murphy 1938). Horner’s high school customers included Boston and Latin high schools for girls, the East Boston and Roxbury high schools for boys and girls, and the Cambridge High School for boys and girls. She supplied an extraordinary number of fresh specimens for their botany courses and practical exams. In 1886, Horner provided specimens to 450 students and their teachers at the Boston and Latin high schools for girls. Beginning in late April, she supplied more than 10,300 specimens representing approximately 80 species and varieties. In 1892, the specimens that she sent to the schools included leaf buds in March, followed by roots, then flowers in May and June that numbered 3400 per week.

The City of Boston itemized payments to Horner under the category of “philosophical, chemical, photographic, and mathematical instruments, chemicals, and botanical specimens” for the schools. She nearly tripled her earnings in the first eight years of her business, from \$50 in 1885 to \$195 in 1893, a relative annual income of \$58,500 in 2021 (City of Boston (Auditor) 1886, 1887, 1888, 1889, 1890; City of Boston (School Committee) 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898; MeasuringWorth 2022). Her earnings from Harvard College and Cambridge High School are unknown but would have added to that income.

After retiring from his railroad job, William followed Charlotte’s lead into the world of botany. He joined her for field meetings and later took a position as an agent for a nursery, collecting stock and recruiting customers (Georgetown Advocate 1898b, 1924; Harvard University 2022). They went together on collecting trips for both businesses. The couple did not have children, but at least one young scholar and a loyal companion also helped Charlotte in her work. As a schoolchild, Raymond Torrey assisted Charlotte in her botanical supply work (Murphy 1938). Each year, they expanded their search area to find plants that were becoming rare locally. Through this experience, Torrey learned the importance of field botany and plant conservation. Time spent side-by-side with the Horners also fostered his love of adventurous outdoor recreation. Torrey

went on to become an important botanist, preservationist, and promoter of hiking as a pastime, advocating for and laying out portions of the Appalachian Trail. Charlotte's dog Prince also accompanied her on her "wood excursions" (Very 1880). Horner's friend, poet Lydia L. A. Very of Salem, Massachusetts, described Prince as, though old, energetically guarding and guiding Charlotte as she hunted for ferns and flowers. Horner closed her botanical supply business in 1898, the year of William's death.

GROUNDBREAKING ADDRESS, PUBLICATIONS, AND AWARDS

Horner was recognized as "that most observing" and "learned" botanist (Alcott 1897; Georgetown Advocate 1924; Newburyport Daily News 1896; Perley 1884) and was nationally and internationally known for her botanical work in the northeastern United States (Journal de Botanique 1888; von Just 1883; Willis 1874). At a time when fewer than seven percent of women botanists in the United States and Canada earned a bachelor's degree or higher (Rudolph 1990), the Massachusetts Horticultural Society served as Horner's academic home. She received a diploma in 1869, perhaps indicating membership, and became a Member for Life in 1873 (Massachusetts Horticultural Society 1872, 1873, 1906; Newburyport Daily News 1906b). Although women had been allowed to participate in its activities for 38 years, she was the first woman to give a scientific talk to the Society in what was its 51st year (Benson 1929).

This 1880 talk was entitled "Native Plants" and was published in the Society's transactions (Horner 1881). Although couched in a Victorian woman's language of modesty and piety, her talk demonstrated botanical leadership and expertise. In her address, she encouraged public education and field study, and continued to advocate for the widespread use of scientific names. Horner stated that, counter to common perceptions, many plant species are not dormant in winter; in fact, quite a few even bloom in the colder months. Having kept detailed phenological records, she listed the exact dates of bloom for 15 species from November to March during the period 1867-1880. Horner encouraged the horticultural use of North American species that would be hardy and profitable as plantings in Massachusetts, including species she had recently received as pressed specimens from Colorado. She also highlighted

plants that would do well as houseplants. To demonstrate her points, she exhibited more than 38 identified, freshly collected specimens, many with flowers or other interesting features. The event attracted "an unusual number" of women. More than 15 attendees, almost all men, participated in the lively, in-depth discussion that followed, described in detail in the transactions of the Society (Massachusetts Horticultural Society 1881a).

Horner was also remarkable as one of only seven women botanists in the northeast United States to publish in scientific journals in the 1880s and 1890s (Creese 1998; Gage et al. 1892; Horner 1881, 1884a, 1884b, 1887; Horner et al. 1887; Kingsbury et al. 1892; Thurlow et al. 1886; Woodman et al. 1889a; Woodman et al. 1889b; Woodman et al. 1893). However, her earliest scientific publications were in the newspapers the Georgetown Advocate and New England Farmer, including the *Flora of Georgetown* [Massachusetts] (Horner 1871, 1876a, 1876b, 1876c, 1876d, 1876e, 1876f). The flora described plant distributions, morphology, and taxonomy, as well introduced and invasive species. This flora, Horner's "Notes on the Flora of South Georgetown," and her paper on introduced plants were widely cited (American Historical Association 1893, 1896, 1907; Ascherson 1894; Baldwin 1884; Britton 1889-1891; *Bullettino della Società Botanica Italiana* 1890; Day 1899; G. and B. 1881; Journal de Botanique 1888; Koehne 1884; Robinson 1881). The South Georgetown piece, as an example of a publication of the Essex Institute, was put on display in the Massachusetts State House in an exhibit associated with the World's Fair: Columbian Exposition (Rantoul 1893).

Between 1871 and 1896, Horner won dozens of awards and cash prizes for her displays of many hundreds of specimens including flowering plants, ferns, mosses, fungi, vegetables, and fruits presented at weekly, monthly, and annual exhibitions of the Horticultural Society and the Essex Agricultural Society (e.g. Essex Institute 1875; Spooner 1883; Thurlow et al. 1886; Wood 1896). In 1877, her displays of rare native species won the most first-place prizes of all the entrants in the native plant category (Spooner 1878). In 1880, she became the first recipient of the Massachusetts Horticultural Society's silver medal for native plants (Georgetown Advocate 1881a; Spooner 1881b). It was written of her exhibit that day, "Mrs. C. N. S. Horner exhibited a very large and well-arranged collection of native plants, with their names. This was without a doubt the best among the many fine exhibits she has made, and your

Committee were glad of the opportunity to express the high estimation in which the members of the Society hold her attainments as a practical botanist” (Spooner 1881b). Practical botany is a field of science that deals with “plant life in all its aspects” and which forms the basis for all applied and economic botany (Robinson 1930). Two years later, Boston newspapers commended her receipt of a second silver medal for “100 species and varieties of native plants” (Boston Globe 1882; Georgetown Advocate 1882c; Spooner 1882).

A LARGE VOLUME OF HERBARIUM WORK

Horner created an extensive herbarium. Only about one-quarter of American and Canadian nineteenth century women botanists are known to have made plant collections (Rudolph 1990). Described as “a most excellent” and “earnest” botanical collector (Knowlton and Deane 1918b; Robinson 1881), she employed custom labels (Figure 1). To find her work, it is important to know that in collections lists she is identified as Charlotte N. S. Horner, C. B. [sic] Horner, C. Horner; C. N. S. Horner; C. S. Horner; Horner, C. N. S.; Mrs. Charlotte Nichols Saunders Horner; and Mrs. Horner. While she did most of her own collecting, her husband, brothers (Edwin C., Gardner S., Henry M.), Henry’s wife, Edna A. (Philips), and their children (Clara E. Latshaw and Elvin H.), the wife of her brother Sylvester P. as well as colleagues collected for her (Harvard University 2022). She tended to use initials rather than names to record herself or a family member as the collector of a specimen. Sometimes she wrote the names of women collectors as “Mrs.” followed by the initials of their husbands.

Horner’s collection included specimens from more than 50 municipalities across at least nine states (Harris 1975; Harvard University 2022). She drove a horse and carriage (Georgetown Advocate 1924) and certainly would have used this skill to access collection sites. Many of these locations also had stations on the Boston & Maine Railroad (Cosgro 2022). This overlap suggests that the Horner’s association with the railroad may have provided her with much of the mobility necessary to carry out wide-ranging botanical investigations. Her rate of collecting in New England appears to have dropped off prior to her husband’s retirement from the Railroad in 1890 (Georgetown Advocate 1890b; Shorthouse 2023). Her second period of highly productive

collecting occurred in Colorado in the years after William’s death. In many cases, Horner added regional information to her labels including “U.S. Flora,” “New England Flora,” “Western Flora,” “Middle States Flora,” and “Southern.” She acquired specimens as gifts from as far away as the Azores (Horner 1885-1905).



Figure 1. Specimens of *Calla palustris* L. (Araceae) collected by Charlotte Horner (bottom of sheet) and her husband William (top of sheet) for Charlotte Horner’s herbarium. Image courtesy of the New England Botanical Society. This image belongs to the Digital Collection of the Harvard University Herbaria (<http://huh.harvard.edu/pages/digital-collections-0>) Appropriate permissions are required for commercial use of the images (<http://huh.harvard.edu/pages/permission-publish-images>) and will incur a publication fee. Publication fees, if applicable, are separate from reproduction fees.

EXPERTISE IN NATIVE FLORA, INCLUDING ORCHIDS AND FERNS

Horner identified Oak Dell in South Georgetown as the most diverse district per area for plant species in Essex County, and the base and sides of a steep hill as the location of an unusual number of rare species (Essex Institute 1883; Horner 1884b). Along with Ebenezer Hitchings, John Robinson, Charles Jenks, and fern expert, George Edward Davenport, Horner was one of a group of regular native plant exhibitors in eastern Massachusetts (Davenport 1902). Her many exhibits on native flowering plants tended to be among the largest and were labeled with scientific names (Barker 1874, 1875, 1877, 1878; Benson 1929; Boston Globe 1881, 1882; Essex Institute 1874; Gage et al. 1891; Georgetown Advocate 1891a, 1891c; Gregory 1881; Horner 1881; Massachusetts Horticultural Society 1881b, 1906; Perley 1877; Robinson 1880b, 1891; Spooner 1878, 1879, 1881a, 1881b, 1882, 1885; West et al. 1876). They included the largest-ever display of native flowering plants with “over 260 species and varieties” (Benson 1929), 110 native specimens as the only presenter (Barker 1875), and “160 varieties of native plants” displayed at Music Hall in Boston, now the Orpheum Theatre (Boston Globe 1881).

Horner gave talks on “Natural Flowers” at the Institute for Women in Salem, Massachusetts, and on “Wild Flowers and Native Trees,” including the early colonial perspective on these groups at a meeting of the Farmer’s Institute in Bradford, both for the Essex Agricultural Society. During both talks she identified large numbers of native plants that could be successfully transplanted to gardens (Georgetown Advocate 1888, 1891c). She led discussions on “Some Plant Families and their Characteristics” for the West Newbury Natural History Club, and “Hardy Plants Adapted for Winter Culture for their Flowers” for the Massachusetts Horticultural Society, reporting on the cultivation of numerous native species (Georgetown Advocate 1891b; Nelson 1884).

Horner was listed by forester and naturalist, Henry Ives Baldwin (1884) as one of only 16 “botanists more or less familiar with the Orchids of [Massachusetts] outside of their respective localities.” In 1885 she exhibited *Habenaria* (now *Plantanthera*) *hookeri* Torr. ex A. Gray from Georgetown at the Massachusetts Horticultural Society in Boston to some excitement (Harris 1975) and successfully propagated orchid species [*Goodyera* R.Br. spp. and *Cypripedium pubescens* Willd., now *C. parviflorum* var. *pubescens* (Willd.) O. W.

Knight] in winter (Baldwin 1884). Together, the New England Botanical Society (NEBC) and Orchid Herbarium of Oakes Ames at Harvard University (AMES) hold 27 orchid specimens collected by Horner and the Peabody Essex Museum Herbarium (PM) holds 10.

By 1896, Horner’s herbarium included one or more species of every known fern genus in the United States, most in duplicate (Harvard University 2022; Horner 1885-1905). Her syntype of *Liatrix punctata* f. *coloradensis* Gaiser is held by the Gray Herbarium at Harvard (GH). The Davenport Herbarium of North American Ferns also included Horner’s specimens (Davenport and Massachusetts Horticultural Society 1879a). She was sought out by Salem, Massachusetts curator and botanist for the Essex Institute, John Robinson, to share her expertise on the ferns of Georgetown and their locations as he was creating the first list of ferns in Essex County (Robinson 1875, 1877). Throughout the years, Horner cultivated enough ferns to occupy 25 sq. m. of land, moving many indoors in winter (Davenport 1891). She gave many away to encourage others to cultivate them. Her presentation on ferns drew an audience of more than 100 people at a meeting of the West Newbury Natural History Club (Horner 1881-1906; Newburyport Daily News 1896). At this meeting, Horner displayed living, herbarium, and fossil specimens. She spoke on their cultivation and history. Horner’s many displays of ferns included a “splendid” collection of 50 scientifically named species and varieties of ferns including 38 “obtained from their native haunts” and one of two “very fine collections of rare species” (Barker 1873, 1874, 1875, 1876, 1877, 1878; Perley 1877; Spooner 1879; Woodford 1887).

EXPERTISE IN INTRODUCED AND INVASIVE SPECIES

Horner’s deep knowledge of native flora allowed her to make unique observations regarding nonnative species. She was credited as one of only five botanists who made important contributions to the documentation of introduced species in the Boston area (Knowlton and Deane 1918b). She created for the Massachusetts Horticultural Society a competitive display of invasive species described as “plants, particularly injurious in cultivated or grazing lands, only one of which is indigenous in this vicinity, though all are found growing wild” (Barker 1876). Horner reported on and made herbarium

specimens of introduced species throughout Essex County (Alcott 1897; Harris 1975; Horner 1876d, 1884a; Knowlton et al. 1908; Knowlton and Deane 1918a, 1918b; Robinson 1880b). She indicated that some of these species were brought in grain or other seeds, or “from the West in wool” (Horner 1884a). In particular, Horner took special interest in “a small blanket manufactory” in Parker River where she observed introduced species as they first became established (Horner 1887; Knowlton and Deane 1918a).

EXPERTISE IN ETHNOBOTANY AND BOTANICAL HISTORY

During her life, Horner was described as “one highly conversant with natural history, and who has devoted herself to the study of the flora of Essex County, especially of her own district, Georgetown and the vicinity” (Essex Institute 1883). Horner gave talks on the local plant species cultivated by Native Americans and the planting of shade trees by Governor Endicott and others (Gage et al. 1891). She spoke on the development of fruit gardens and orchards by the Pilgrims and Puritans (Gage et al. 1891) and presented competitive displays of beans, apples, and pears (Brackett 1878; Currier et al. 1892; Davis 1876, 1877, 1878; Moore 1978, 1979; Thurlow 1881; Wood 1887, 1896).

Horner gave a talk on the many ornamental and medicinal plants grown by women for generations and was confident in her knowledge of plant toxicology. She shared information about conditions under which prussic acid in the leaves of wild cherry trees could be fatal to animals, and about the medicinal qualities of prickly ash (Horner 1871; Robinson 1880b). Two months before her death, Horner challenged a fellow botanist, George Golding Kennedy, when he sent her a purported remedy for her asthma: “...I shall try the contents as I am sure you would send nothing dangerous, and even if “Prairie Weed” is *Spiesia lambertii* (Loco) I’m sure you have tested it and found it does not affect the human race as it does horses, and I shall show my gratitude to you by giving it a faithful trial” (Horner 1906). The species to which she referred, now *Oxytropis lambertii* Pursh, is sometimes deadly to livestock (Ralphs and Stegelmeier 2011) and not widely recognized as helpful for asthma.

EXPERTISE IN ANCIENT TREES AND ARBORICULTURE

Ancient trees held a special interest for Horner. She measured a red maple near the site of Gage’s Ferry on the banks of the Merrimack River in Bradford, Massachusetts, which likely had the largest circumference of any tree in the county – 26 ft. at 4 ft. from the ground with one branch showing a circumference of 12.5 ft. (Robinson 1880b, 1891). At a meeting of the Massachusetts Horticultural Society, she contributed to a discussion of ornamental arboriculture. She recommended the American chestnut and highlighted chestnuts that had been planted in Georgetown in 1735 (Massachusetts Horticultural Society 1882). She reported that one of those trees still standing 147 years later measured 13 ft. 10 in. in circumference at the narrowest point of the trunk.

Horner was also interested in shrubs. She was included in a “List of Discoverers and those who have Selected, Named, and/or Introduced Varieties and Clones” who had been associated with more than two *Ilex* L. varieties, in the Bulletin of the Holly Society of America (Holly Society of America 1953). She also described the discovery of a white-fruited *Ilex* in North Andover, its transplanting to the Follansbee nursery, and the subsequent donation of a cutting to the Arnold Arboretum (Essex Institute 1895). It was noted that “Professor Gray considered this plant simply a freak, like the white huckleberry, etc.” She advocated for the mountain laurel as the national flower and recommended native shrubs for cultivation (Georgetown Advocate 1890a; Horner 1881).

A VALUED LEADER AND COLLEAGUE

Like North American women botanists before her, Horner’s friendships and the networks she built and joined were critical to her development, and they likewise benefited from her contributions (Shteir and Cayouette 2019). Horner had a prominent role in the Boston-area botanical and horticultural scene and regularly attended Saturday meetings of the Massachusetts Horticultural Society at Horticultural Hall in Boston (Horner 1885-1905) and was sometimes invited to lead discussions (Massachusetts Horticultural Society 1881b). She was also elected to membership in the Essex Institute in 1895 (Essex Institute 1898), and collaborated with the Boxford Natural History Club, West Newbury Natural

History Society, and the New England Botanical Club. Horner frequently served on and sometimes led committees that judged competitive displays of flora and contributed to the establishment of rules for these competitions (Gage et al. 1892; Georgetown Advocate 1896, 1897; Kingsbury et al. 1892; Thurlow et al. 1886; Woodman et al. 1889a; Woodman et al. 1889b; Woodman et al. 1893). John Robinson botanized with and would have learned from Horner, 23 years his senior, at field meetings of the Essex Institute (Georgetown Advocate 1877). She was known to botanist and Gray Herbarium librarian Mary Day, who wrote to her for a copy of her *Flora of Georgetown* and the *Flora of Boxford* by Boxford, Massachusetts botanist Mary Ellen Perley (Horner 1881-1906).

Only 14% of nineteenth century American women botanists exchanged specimens (Rudolph 1990). Horner was one of the few who exchanged both letters and specimens with other botanists near and far (Cassino 1895; Davenport 1883; Harvard University 2022; Horner 1881-1906, 1885-1905). Davenport sent her specimens and his writing, and she shared specimens with him for identification.

DEDICATION TO EDUCATION

Horner was committed to the education of both children and adults in botany and natural history. When she published the *Flora of Georgetown*, she did so with the aim of educating its citizens about their own natural heritage (Horner 1876a); she wrote, “I have, too, an earnest wish that our young people may become interested in the natural sciences, a little knowledge of which, adds untold interest to the world in which we live.” Horner encouraged others to write floras of their towns with the purpose of improving the botanical knowledge in her home region; she wrote, “That the flora of Essex County is unusually rich and varied, had long since been decided by eminent Botanists, and Tracy’s Essex County Plants, Mr. Robinson’s Ferns of Essex County, and the valuable collection of pressed specimens, bequeathed to the Essex Institute by the late William Oaks Esq., are proof positive that such is the fact. The collection above named is at the present time being remounted and arranged, and it is found that some plants now known in this vicinity are not in that collection. It has been thought by some that if each town would as far as practicable give a list of its trees, shrubs, and flowers, there might be some valuable additions made to the

Herbariums of the Institute” (Horner 1876a). Horner exhorted readers of the Georgetown Advocate to use scientific names and to start a botanical club in Georgetown (Horner 1876a, 1876e).

Horner led the botanical fieldwork for and gave talks to joint field meetings that numbered up to 200 participants and included the West Newbury Natural History Club, Boxford Natural History Club, Danvers Scientific Association, and Essex Institute (Essex Institute 1883; Georgetown Advocate 1872, 1882b, 1883). She hosted a meeting of the Boxford Natural History Society at her home (Georgetown Advocate 1882a), and her displays for the Massachusetts Horticultural Society were considered “centres of interest and instruction to the large number of visitors” (Barker 1876).

In 1877, Horner became a founding member of the Window Gardening Committee of the Massachusetts Horticultural Society, which had the aim of involving “the laboring classes,” and their children in particular, in practical botany (Massachusetts Horticultural Society 1878, 1883; Wolcott 1878). It was the Society’s first program to engage children in botany (Massachusetts Horticultural Society 1906). During this period, the practice of keeping houseplants was common in Europe, but had not yet been widely adopted in the United States (Jönsson-Rose 1895). The committee advertised in the *Boston Herald*, enlisted pastors and teachers to spread the word about the project and developed a plan to award prizes. Wolcott, the Secretary of the committee, reported that, “The touching spectacle of the procession of little children bearing their plants so proudly through the street, and presenting them to the Committee, carried its blessing” (1878). The work of this committee continued successfully up until at least the time of Horner’s death (Massachusetts Horticultural Society 1906). Horner was also a member of a committee of the Massachusetts Horticultural Society that promoted “winter gardening, and culture of winter flowers” (Georgetown Advocate 1878b).

ADVENTURER AND ADVOCATE FOR WOMEN

Horner provided her peers with an example of a married woman who was also a delightful idealist, politically engaged, and an adventurous traveler. Her petition for Women’s Suffrage, signed by others from Georgetown, was presented to Massachusetts House of Representatives as one of a set of suffrage petitions on that day, and among approximately a

dozen such sets of petitions submitted that year (Merritt 1869). During the Civil War, she drove a horse and wagon throughout the region to solicit supplies for hospitals and worked tirelessly with other women to make bandages and dressings for soldiers' wounds (Georgetown Advocate 1924). William took her for rides on a hand-propelled railroad car (Georgetown Advocate 1924). It was also reported that, at the age of 61, "Mrs. Wm. H. [sic] Horner, while botanizing near the "Mountains" in Boxford this week, killed a water snake that measured five feet long. She is not the woman to flee in dismay from a meadow mole or a water adder" (Georgetown Advocate 1885). The species mentioned was likely a northern water snake, which resembles a venomous adder.

Shortly after William's death and just a few days before turning 75, Horner set off on a trip to Colorado (Horner 1898a, 1898b, 1898c, 1898d). Along the way, she observed the wildflowers of the Berkshire Hills and horticultural plantings in multiple cities. She noted the agriculture of Ohio, Indiana, and Illinois, vibrant Mexican American farming communities, and apple orchards. On reaching Colorado, Horner spent weeks traveling over rough roads, across muddy rivers, and through mountains and valleys, botanizing and camping at multiple stops along the way. She camped in the Rocky Mountains at Wagon Creek, 9000 ft. above sea level (Georgetown Advocate 1898a). She observed trees, shrubs, and wildflowers near Pass Creek Canyon, prairies near Pueblo, and wildflowers near Hardscrabble Canyon. She visited mineral springs in Manitou and collected flowering plants and oak branches at the base of Pike's Peak. She went via horse and carriage to Garden of the Gods; Ute Pass, where she made observations of wildflowers; Grand Caverns; and Cheyenne Canyons, where she noted ferns and wildlife. Horner stayed on to live with her brother, his wife, and their son until at least 1900 (Comiskey 2017) and brought herbarium specimens home when she returned (Harvard University 2022).

HORNER'S FINAL DAYS: THE DISPERSAL OF AND ENDURING INFLUENCE OF HER HERBARIUM

Horner continued her botanical work until the end of her life. The Peabody Academy of Science (a predecessor to the Peabody Essex Museum) led by John Robinson and under the direction of Edward S. Morse, accessioned dried plants numbering fewer than 150 directly from Horner in 1885

(Robinson 1886). Harris's *A Flora of Essex County, Massachusetts* (1975) is an accurate description of the specimens held by the Peabody Essex Museum Herbarium at the time of publication. At least one of her specimens, *Ilex verticillata* f. *chrysocarpa* B.L. Rob. from Georgetown, was held by the Gray Herbarium as early as 1900 (Robinson 1900).

By January 1905, she described herself as "no longer an active worker" and, at the age of 81, she put her herbarium of at least 2500 additional specimens in order (Horner 1885-1905). In May 1906, she wrote to "Dear Botanical Friends," a group that included botanist George Golding Kennedy, "if any of my specimens will aid you, I will be very glad for you to have them" (Horner 1906). He replied that a new botanical club would likely be interested in her specimens from Essex County (Kennedy 1906). Just weeks before her passing, Horner offered to donate her collection to the New England Botanical Club, writing, "it would be a delight to me to think that they were doing good in the world" (Horner 1906).

Horner died in 1906 at 83 years of age. She is buried next to William in Union Cemetery in Georgetown where her headstone is inscribed with her maiden name (Boyington 2012). Despite the nascent plan, her collection was auctioned off on October 6, 1906, along with her diploma from the Massachusetts Horticultural Society (Newburyport Daily News 1906a). The auction was held at her late residence and was, notably, attended by many people from outside of Georgetown (Newburyport Daily News 1906b). For the week after the auction, her herbarium was on display in Boston.

By the next month, Horner's collection was held by a secondhand store in Boston, perhaps sustaining damage along the way. Preeminent New England botanist Merrill Lyndon Fernald tried to assess its value: "Mr. Fernald reported having made ineffectual attempts to examine the Mrs. Horner herbarium now on sale at a secondhand store in Boston. That portion which he was allowed to see was practically worthless & difficulties were encountered in examining the whole of it. The dealer's ideas concerning its value were moreover quite preposterous, therefore he had dropped the matter" (Merrill 1954; New England Botanical Club 1906).

Nevertheless, the collection was not lost entirely. On January 4, 1907, Fernald announced the purchase of the herbarium for \$25 (the equivalent of approximately \$761 in 2021; (MeasuringWorth 2022) by Mr. F. S. Collins, reporting

that “The herbarium turns out to be more valuable than was anticipated. There are nine hundred to one thousand mostly from Essex County, six hundred to seven hundred sheets from localities outside of New England which will be valuable as exchange material, and the remaining one thousand sheets are worthless” (New England Botanical Club 1907). Later that academic year, the curator of the Gray Herbarium wrote that “Among the sets of plants received during the year the following have from their extent or rarity been noteworthy : - [...] from the New England Botanical Club, 636 plants for the herbarium of the late Charlotte N. S. Horner” (Robinson 1908). By May, her specimens of *Botrychium obliquum* f. *elongatum* Gilbert & Haberer were held by both the New England Botanical Club and the Davenport Collection (Harrison et al. 1907).

The Harvard University Herbaria Digital Collection includes 792 specimens collected by or for Horner. Of these, 194 are dated from 1870 - 1900. Only 123 are designated as belonging to the Gray Herbarium (GH), while 661 belong to the New England Botanical Society (formerly Club). An additional four are in the Herbarium of the Arnold Arboretum (A) and another four in Oakes Ames Orchid Herbarium (AMES). The specimens in the Gray Herbarium appear to be from mainly outside New England and so may be from the 600 - 700 purchased by Collins and suspected by him to be valuable as exchange material; it is not clear what became of the remaining 513 that the Gray Herbarium acquired from the New England Botanical Club.

Today, at least 495 Horner specimens are included in the PEM, all from Essex County. Perhaps some of these were among the New England specimens purchased by Collins and represent the balance of those not in the New England Botanical Society collection. There are at least 14 Horner specimens at eight other herbaria (Albion R. Hodgdon Herbarium, University of New Hampshire [NHA]; George Safford Torrey Herbarium, University of Connecticut [CONN]; Stuart K. Harris Herbarium, Boston University [BSN]; William and Lynda Steere Herbarium, New York Botanical Garden [NY]; the Yale University Herbarium, Peabody Museum of Natural History [YU]; the Carnegie Museum of Natural History Herbarium [CM]; the Herbarium of the University of South Florida [USF]; and the Missouri Botanical Garden [MO]). No fewer than 1301 of Horner’s herbarium specimens exist today, contributing scientific value to at least 13 collections, but representing at most about half of her original collection.

Horner’s herbarium specimens have enabled at least 78 scientific publications. In fact, during the short time since February 2019, authors in at least 24 countries referenced her specimens in least 38 articles (Shorthouse 2023). These articles advance the fields of biogeography, evolution, conservation biology, ecology, genomics, palynology, phylogeny, and taxonomy, and informing our understanding of climate change, invasive species, and food security (Bartlett 1909; Davenport 1883; Davenport and Massachusetts Horticultural Society 1879a, 1879b; Drew 1936; Fernald 1910, 1911, 1921, 1922, 1941; Fernald and Bissell 1910; Gaiser 1946a, 1946b; Harris 1975; Harrison et al. 1907; Knowlton et al. 1908, 1909, 1911; Knowlton and Deane 1916a, 1916b, 1918a, 1918b, 1919a, 1919b, 1920, 1921, 1922, 1923a, 1923b, 1923c, 1924a, 1924b, 1924c; Koehne 1903; Robinson 1900; Robinson 1875, 1880a, 1880b; Shorthouse 2023; Sorrie 1987; Weatherby 1924). More than 20 years before she passed, Horner commiserated with Davenport that the ability to use their “best powers” was often “subordinate” to other demands and told him she had already “put away some work for that life [beyond]” (Horner 1881-1906).

CONCLUSION

Charlotte N. S. Horner made significant contributions to the botanical literature, prominent modern herbaria, and public education. Her outstanding botanical aptitude and interest were supported by an adventurous family background, a dedicated botany teacher, and a child-free marriage to an enthusiastically engaged husband. The Massachusetts Horticultural Society provided her with an intellectual home where she could share ideas and build on her expertise. The work of most women scientists of Horner’s time was not well preserved (Bronstein and Bolnick 2018). We are fortunate that Charlotte Horner left a legacy of herbarium specimens and published articles that secure her place in New England’s botanical history.

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