

BOTANY AT BILTMORE: AN UNUSUAL CASE OF PRIVATE SUPPORT OF SCIENCE

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Abstract: George Washington Vanderbilt financially supported extensive botanical activities at his Biltmore estate in North Carolina at the turn of the 20th century: widespread plant collections, a large herbarium, and a journal, *Biltmore Botanical Studies*. Although discontinued after a few years, such activities were a significant contribution to knowledge of the flora of the southeastern United States.

Key Words: Biltmore estate; botany; herbarium; southeastern flora; *Biltmore Botanical Studies*.

INTRODUCTION

Much has been written about George Washington Vanderbilt's magnificent Biltmore estate near Asheville, North Carolina: the architecture of its immense chateau (Bryan 1994); the landscaping of its grounds (Roper 1973; Messer 1993; Hall 1995); its pioneering managed forestry operations (Price 1914; Frome 1962; Pinkett 1970); its forestry school, the first in America (Schenck 1955); the history of its preservation until the present (Covington 2006); the life of its owner (Vanderbilt 1989; Morgan 1996); and its status as a national historic landmark (Hood 2003). Little note has been taken, however, except by plant taxonomists, of the botanical activities which took place there for about a decade during its early years.

These activities had their genesis in the sweeping plans of the landscape architect engaged by Vanderbilt to lay out his grounds, Frederick Law Olmsted. Olmsted envisioned a variety of supporting or related features as additions to the plantings (Messer 1993). These included a nursery to supply plants for the landscaping; a large arboretum of specimen trees; a scientific museum containing collections of rocks, minerals, woods, animals, archeological artifacts found on the estate; and an herbarium and associated botanical library. Vanderbilt approved such plans in principle in July 1890. Some of these features remained ultimately unrealized, notably the arboretum and museum, but the plant collections and herbarium were effected. Indeed, the men responsible for carrying out such work in the end expanded it significantly, even beyond what Olmsted had imagined.

PERSONNEL

Five individuals were primarily involved in the botanical work at Biltmore. Chauncy Delos Beadle (1866–1950), a Canadian-born horticulturist who had studied at Ontario Agricultural College and Cornell University, came to Biltmore in 1890 to manage the nursery operation established by Olmsted and was later also named

director of the herbarium (Anonymous 1960). He was the principle instigator of the botanical work which occurred, for he viewed the estate as a preserve for all kinds of plants that would grow in the southern Appalachian region (Covington 2006).

Frank Ellis Boynton (1859–post 1935) was born in Vermont, grew up in New Jersey, and moved to Highlands, North Carolina, in 1881 (Sargent 1902; Boynton 1917; Boynton 1935). He had no formal botanical education, but through gathering plant specimens for sale became quite familiar with the flora of the southern Appalachians, on which he published a popular article (Boynton 1887). He and his brother Charles Lawrence Boynton in 1886 guided the botanist Charles Sprague Sargent on a field trip into the Keowee River gorge, where they rediscovered the original home of Michaux's rare *Shortia*; he later published an account of this trip (Boynton 1889). He joined the staff of the Biltmore Herbarium in 1893.

Francis Marian "Frank" (Crayton 1872–1960) was born and lived in Buncombe County, North Carolina (Crayton 1935; International Genealogical Index 2006). He had no formal botanical education, but was hired as a nursery worker at Biltmore in 1894. He soon became familiar with plants of the region and was given a position with the Biltmore Herbarium.

Charles Lawrence (Boynton 1864–1943) was born in New Jersey (Simpson 1979; Boynton 1935). He also had no formal botanical training, but after moving to Highlands, North Carolina, he became interested in the natural history of the region and made observations of the flora and fauna. He guided the ornithologist William Brewster in a survey in 1885 of the birds of western North Carolina (Brewster 1886). He was engaged to work with the Biltmore Herbarium in 1895.

Thomas Grant Harbison (1862–1936) was a native of Pennsylvania (Sargent 1902; Totten *et al.* 1936). He was largely self-taught in botany, but earned B.S., M.A. and Ph.D. degrees by correspondence. He worked as an educator in schools of western North Carolina beginning in 1886, and then became a plant collector for the Biltmore Herbarium in 1897.

Two other botanists were associated at different times with the Biltmore Forest School, but apparently did not contribute to the work described here. They were Clifton Durant Howe (1874–1946) (Anonymous 1946) and Homer Doliver House (1878–1949) (Lemon 1950).

PLANT COLLECTIONS

Specimens in the Biltmore Herbarium were collected primarily by the first five workers named above (Lanjouw and Stafleu, 1954), although at least one other person, Frederick Law Olmsted, Jr., participated in at least one collecting trip with Frank Boynton in 1895 (Barden and Matthews, 2004). These workers investigated the flora of the estate itself in accordance with the idea of the senior Olmsted, but also collected much more widely. Harbison made at least one trip through eastern North Carolina in 1898 (Totten *et al.* 1936). Different combinations of individuals made extensive collections in all of the southeastern states from about 1895 to about 1902 (Boynton 1895–1902; Boynton and Harbison, 1899; Totten *et al.* 1936; Patrick *et al.* 1995). Charles Boynton and Harbison even traveled to western states, collecting in the Rocky Mountains of Colorado and New Mexico and in the Pacific

region (Weston 1902; Totten *et al.* 1936; Simpson 1979). These various collecting trips were, of course, underwritten by Vanderbilt.

THE HERBARIUM

The Biltmore Herbarium was large, mainly as a result of the extensive collections by its workers. Weston (1902) reported that it held 500,000 specimens representing 15,000 species, but it was said to contain in 1916 "upward of 100,000 specimens" (Smithsonian Institution 1918). These numbers included the important second herbarium of the southern botanist Alvin Wentworth Chapman, which Vanderbilt purchased (Trelease 1899). The collection and its associated botanical library were housed in a fireproof building built on the bank of the Swannanoa River (Weston 1902), an ultimately unfortunate location.

The herbarium and its staff cooperated freely with other botanists and herbaria. A list of specimens available for exchange was published early on (Beadle 1896), and specimens from Biltmore were eventually deposited in at least 32 other herbaria in 11 states and 10 foreign countries (Lanjouw and Stafleu, 1954). The Alabama botanist Charles Theodore Mohr moved to Asheville in 1900 especially to work in the herbarium (Smith 1901). The author Alice Lounsberry (Rickett 1950) and the artist Marian Ellis Rowan (Hazzard 1988) consulted it during the preparation of their book on southern plants (Lounsberry 1901), for which Beadle wrote the introduction. Paul Reed of the Charleston Museum found the historically important herbarium of Stephen Elliott to be in deplorable condition and sent it to Biltmore for fumigation and safekeeping until his institution could provide proper housing for it (Sanders and Anderson, 1999).

PUBLICATIONS

Biltmore workers not only collected plants and established an herbarium, but in addition published botanical papers based on their acquisitions. Beadle (1898) contributed a three-part study in which, among other descriptions, he named 22 new species in six genera. He also published two papers on the genus *Crataegus* in which he named a total of 17 new species (Beadle 1899, 1900).

Vanderbilt also briefly underwrote the publication of a journal, *Biltmore Botanical Studies*. Issued by the Biltmore Herbarium and printed in England, this publication contained 13 papers and appeared in the years 1901 and 1902 in one volume of two numbers. Described therein were 151 new species in 10 genera. Beadle produced 126 of these descriptions in the genus *Crataegus* alone. A complete listing of the contents of this journal is provided in the appendix because it is of limited availability, because it contains such a large number of new species descriptions, and in order to indicate the subjects addressed by the Biltmore workers.

Beadle's work on *Crataegus* deserves further comment. Brown (1910) noted that before 1896 about 100 North American species of the genus had been described, whereas since that date 866 new species were named. Most of the latter, 833, were described by three workers: Charles Sprague Sargent (524), William Willard Ashe (165), and Beadle (144). These men based their distinctions on small differences which apparently bred true from seed. Unfortunately what they did not know at the

time is that hybridization, polyploidy, and apparently sexual but actually asexual reproduction (agamospermy) are widespread in this genus (Phipps 2003). Consequently many of the populations which they regarded as species were in fact simply clonal individuals. Camp (1942) called this situation a “veritable witches’ brew,” and Sutton (1970) dubbed it a “taxonomic disaster.”

THE END

Vanderbilt’s method of financing his Biltmore estate was casual and loose: he authorized what he wanted done and then paid whatever it had cost (Roper 1973). As a result he was spending too much of his capital. He suffered significant financial losses from investments in a bank and a ship-building company in 1902 (Hood 2003). Then as a consequence of a panic in 1907 timber prices collapsed, reducing the income of the estate. He was forced to slash the annual maintenance expenditure from \$250,000 to only \$70,000 (Covington 2006). This financial difficulty was further exacerbated when he died unexpectedly in 1914. Not surprisingly, botanical activities were among those curtailed or eliminated entirely during this period.

The men associated with the botanical work sooner or later dispersed, except for Beadle. He was named superintendent of the estate in 1904 (Hood 2003; Covington 2006) and remained with it until he died in 1950. Under his management the plant nursery was a financial success, bringing in up to \$150,000 per year; its sales catalog was even used by some botanists as a textbook. He later served as landscape architect for Biltmore Forest, an exclusive residential community developed on former estate land (Swaim 1981). He also amassed a large collection of azalea (*Rhododendron*) cultivars which he eventually gave to the estate as the Beadle Garden.

Departing in 1903, Harbison was the only Biltmore worker who subsequently carried on purely botanical activity (Totten *et al.* 1936). He served the Arnold Arboretum and the Geological Survey of Mississippi at different times, and from 1933 until his death in 1936 was associated with the herbarium of the University of North Carolina at Chapel Hill. Frank Boynton was from 1902 “connected with a commercial enterprise” and later operated a small farm (Boynton 1917). Charles Boynton in 1905 bought a ranch in California, where he remained until his death (Simpson 1979). Crayton continued to work in the Biltmore plant nursery for as long as it existed, then operated a nursery of his own (Crayton 1935).

The Biltmore Herbarium continued to be maintained, if not increased, until disaster struck in July 1916. Storms resulting from two hurricanes, one from the Gulf of Mexico and one from the Atlantic Ocean, dropped huge amounts of rain on western North Carolina, causing severe flooding of the French Broad and Swannanoa Rivers (Southern Railway Company 1917; Tennessee Valley Authority 1960). The effects on the Asheville area were disastrous. The plant nursery and greenhouses at Biltmore were totally destroyed and the herbarium severely damaged (Hood 2003). Only about 25,000 specimens could be salvaged. The following year these were given by Vanderbilt’s widow to the United States National Museum, along with the remnants of the botanical library and some microscopes (Smithsonian Institution 1918). Botany at Biltmore was at an end.

CONCLUSION

George Vanderbilt certainly had a curiosity about nature. When at his Biltmore estate “he spent hours walking in the mountains and pursuing an intense study of the trees, flowers, and natural beauty he found there,” often accompanied by Beadle (Covington 2006). It was not uncommon in his day for a private individual to collect and study plants and keep a personal herbarium. His case was unusual, however, in that he did not pursue these activities himself, but rather used his considerable fortune to employ others to do them. His support provided extensive plant collections, a large and well-appointed herbarium, and a botanical journal, however short-lived.

Commenting on the proposed arboretum at Biltmore, the botanist Charles Sprague Sargent said that its value would depend on its permanence, and “permanence could not be expected in one dependent on an individual’s interest, which might flag, or fortune, which might wane” (Roper 1973). Such words were indeed prophetic for botany as a whole at Biltmore, for Vanderbilt’s fortune did indeed wane. Nevertheless, in just a few years his support contributed significantly to knowledge of the flora of the United States, especially of the southeast.

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APPENDIX

Contents of and numbers of new species descriptions in *Biltmore Botanical Studies, a Journal of Botany Embracing Papers by the Director and Associates of the Biltmore Herbarium*. Printed in London, England, by W. Wesley & Sons.

Volume 1, Number 1, 8 April 1901

- BEADLE, C. D. AND F. E. BOYNTON. Revision of the species of *Marshallia*. P. 3–10. (3 new species).
BOYNTON, C. L. AND C. D. BEADLE. Notes on certain cone-flowers. P. 11–18. (5 new species of *Rudbeckia*).
HARBISON, T. G. New or little-known species of *Trillium*. P. 19–24. (3 new species).
BEADLE, C. D. New species of thorns from the southeastern states. P. 25–47. (21 new species of *Crataegus*).
BEADLE, C. D. A shrubby oak of the southern Alleghenies. P. 47–48. (1 new species of *Quercus*).

Volume 1, Number 2, 30 April 1902

- BEADLE, C. D. New species of thorns from the southeastern states. II. P. 51–137. (105 new species of *Crataegus*).
BOYNTON, F. E. Studies in the genus *Amorpha*. P. 138–140. (4 new species and combinations).
BOYNTON, F. E. Two new species of *Coreopsis*. P. 141–142.
BOYNTON, C. L. Notes from a collector's field-book. P. 143–150. (1 new species of *Gerardia*).
HARBISON, T. G. A sketch of the Sand Mountain flora. P. 151–157.
HARBISON, T. G. New or little-known species of *Trillium*. II. P. 158. (1 new species).
BEADLE, C. D. Studies in *Philadelphus*. P. 159–161. (3 new species and 1 new variety).
BEADLE, C. D. Two drupaceous trees from Alabama. P. 162–163. (2 new species of *Prunus*).