

EARLY VASCULAR PLANT COLLECTIONS FROM EASTERN WYOMING AND WESTERN SOUTH DAKOTA FROM 1800-1940

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ABSTRACT

The earliest scientific plant collections in the study area were probably made by members of the 1804-1806 Lewis and Clark Expedition. They were followed in 1811 by Nuttall and Bradbury in an expedition of "Overland Astorians." Geyer and Hayden collected in the next decades. In the 1870s Donaldson and Jenney briefly explored the Black Hills. The first expedition dedicated to scientific collection of plants was accomplished by Rydberg in the 1890s who was said to have identified 700 species from the Black Hills. Hayward from Milwaukee collected over 2000 specimens in 1926 and 1927. Eventually, South Dakota collectors including Visher, McIntosh, Over and Bennett (1908-1940) added greatly to our collections and to knowledge of the flora of the region. Information on numbers and disposition of collections was obtained from a database of vascular plant collections from the area. Collections were sporadic at best prior to 1890. During the time period represented by this study, the decade of the 1920s was the time of the largest number of collections (>8000) with the major contributions by Hayward, McIntosh and Over.

Keywords

botany, plant specimens, South Dakota, Wyoming, historical collections

INTRODUCTION

In the past, knowledge of historical collections and collectors from any particular region was largely housed in the memories of old botanists. While some literature reports are available for specific collectors or collections, there has not been a reasonable way to enumerate historical collections in the study area. The advent of regional databases has made it possible to quantify dates, numbers of species and specimens, and distributions. It is the purpose of this paper to list

the significant plant collections made in western South Dakota and eastern Wyoming and to indicate where those plant collections have been deposited.

METHODS

The study area covered by this presentation includes all counties in South Dakota west of the Missouri River and Crook and Weston Counties in eastern Wyoming. Included are major plant collections made in the study area between the years 1800 and 1940.

This manuscript is organized by placing the early collectors into three categories. The first includes collectors who journeyed and collected specimens on or adjacent to the Missouri River. The second category includes collectors who traveled well beyond the Missouri River but were in South Dakota or Wyoming only seasonally. The third group includes people who were residents of South Dakota or Wyoming and collected and housed their collections in regional herbaria. Herbarium acronyms (Table 1) used in this report were taken from Thiers (2010). Data for most collections/collectors were extracted from a consolidated database (available at <http://herbarium.bhsu.edu/>) including data for the study area from 16 herbaria.

Collections enumerated in this manuscript were chosen because of historical importance, the size of the collection, or because of the novel nature of the collector and/or collection. A more complete list of collections/collectors is provided in Table 2.

RESULTS

Collections Along the Missouri River—The first scientific collections of vascular plants in our study area were probably made by members of the Lewis and Clark Expedition (1804-1806). Reveal et al. (1999) noted that of 232 known specimens from the pioneering journey, 226 are housed at PH. Others are housed at K or GH. Many of the Lewis and Clark collections were taken to England for study by Pursh, who wrote the landmark work *Flora Americae Septentrionalis* (Pursh 1813). Many of these were later purchased and returned to Philadelphia (Reveal et al. 1999).

Thomas Nuttall was an Englishman who worked briefly as a printer in St. Louis. He went up the Missouri River in the spring of 1811 with the “Overland Astorians” who were headed to Oregon for the Pacific Fur Company, a subsidiary of the American Fur Company, and sponsored by John Jacob Astor. The expedition was led by Wilson Price Hunt. Nuttall apparently did not keep a journal and the exact route taken for his plant collections is unclear, although he apparently did not venture long distances from the Missouri River. Nuttall traveled to the “Arikara villages in northern South Dakota and then, in company with the fur trader Manuel Lisa proceeded to the country of the Mandan Indians in North Dakota” (McKelvey 1955 p. 142). Nuttall returned with his plants to St. Louis in October of 1811 and learned of the potential war between

England and the United States. To the distress of his employer, Benjamin Smith Barton, he went to New Orleans and sailed with his plants for England where he showed some of his collections to Pursh who was working on the Lewis and Clark collection at the time. Disagreements ensued which are beyond the scope of this paper, but Nuttall returned to the United States in 1814 and published the *Genera of North American Plants* in 1818.

On the same expedition was John Bradbury, another Englishman, who had some training as a botanist, became a fellow of the Linnean Society in 1792, and was corresponding secretary of the Liverpool Philosophical Society (McKelvey 1955). Unlike Nuttall, Bradbury did keep a journal of his travels on this expedition. From the Arikara villages Bradbury made a trip about 200 miles farther north with Ramsay Crooks to the Mandan villages. Upon returning to the main body of the Hunt expedition, still at the Arikara villages, Bradbury left the group on 17 July 1811 and returned to St. Louis. Bradbury apparently became ill in St. Louis and did not leave for New Orleans until December. He apparently was in transit December 15th–21st (1811) and experienced the series of severe earthquakes along the New Madrid fault. He later was delayed in New York during the war of 1812, however, his plants arrived in England. When he finally returned to England, he found that Pursh (1813) had already studied his plants (McKelvey 1955). Bradbury's plant specimens are distributed in PH, K and LIV. Fortunately, during WWII approximately 250 Bradbury specimens were sent for storage to Wales, and consequently were saved from destruction of the museum in Liverpool. Bradbury is most noted for his travelogue (1817).

Karl A. Geyer was a German who came to the United States in 1835 and a few years later accompanied the Nicollet Expedition (1838 and 1839). The purpose of the expedition was to "undertake the full exploration of the Mississippi River from its mouth to its sources" (Nicollet 1843, p. 3). Nicollet paid personally for the services of Geyer to act as "practical botanist." The 1838 expedition explored the Minnesota River and into eastern South Dakota, and in 1839, Nicollet and Geyer extended the expedition from St. Louis to Ft. Pierre. In Geyer's words to Hooker "...we surveyed the Missouri as high up as the Little Missouri and almost the whole of that immense country ...between the Missouri and Mississippi" (Geyer 1845). Geyer somehow lost about half of the collections on the return trip. Nicollet's (1843) report of the trip included the catalog of plants identified by John Torrey in his Appendix B. Remaining collections from this expedition are housed primarily at NY and US.

Collections Beyond the Missouri River—Ferdinand Vandever Hayden was known primarily for his expertise in geology, especially in the Rocky Mountain west. He also served as a surgeon during the Civil War. Hayden was well-educated with degrees from Oberlin College in 1850 and Albany Medical College in 1853. In 1855, 1856 and 1857 Hayden accompanied G.K. Warren's expeditions in the region between the Platte River and Missouri River and west to the Rocky Mountains. Hayden's report (1875) stated that 1500 specimens of plants were collected and listed 593 species, mostly identified by George Engelmann, some by John Torrey, and some by Hayden himself. Collections of the Hayden specimens are at MO and NY.

Aris B. Donaldson was hired as one of the original faculty members of the University of Minnesota where he taught rhetoric and English literature. He apparently resigned his position to serve as a botanist on the G.A. Custer expedition to the Black Hills in 1874 (Krause and Olson 1974). On the expedition, he also served as a correspondent for the St. Paul *Pioneer*. There are numerous reports about the abundance of wildflowers (Krause and Olson 1974, Progulske and Shideler 1984), but for some reason Donaldson collected a limited number of specimens. Coulter (1874) published a list of 74 herbaceous species collected by Donaldson. The following year Winchell published a list of 22 trees and shrubs “seen in the Black Hills” (p. 67 Winchell 1875). A second list of 18 species of trees and shrubs (many duplicates of the first list) was the result of “a reconnaissance towards the Bad Lands, ... noted along the lower slopes of the Black Hills in the valley of French Creek” (p. 68 Winchell 1875). The list of plant specimens identified by Coulter was republished (Winchell 1875) with some changes. Approximately 40 specimens of the Donaldson collection have been located at NY (Masson 1994). More recently 11 specimens have been located at PUL (Shaner and Harby 2008), leaving about 23 specimens of unknown location.

W. P. Jenney collected plants on the 1875 expedition to the Black Hills (Newton and Jenney 1880). The plants were identified by Asa Gray and a list including 175 species was published as a chapter (pp. 529-537) of the 1880 report. At least some of the plant specimens are at GH, including the type specimens of *Oxytropis monticola* A. Gray.

Per Axel Rydberg was born in Sweden and came to the United States in 1882. He studied botany at the University of Nebraska under the guidance of C. E. Bessey and obtained his B.S. in 1891. In 1892 he was employed by the U.S. Department of Agriculture to study the flora of the Black Hills. According to McIntosh (1931), Rydberg's study of the Black Hills flora was the first with botanical exploration as its primary goal. In Rydberg's *Flora of the Black Hills of South Dakota* (1896) he enumerated “a little over 700 Phaenogams (sic) and Fernworts” (p. 478). Many of Rydberg's specimens are at NY, but there are also significant numbers at SDC and RM. Rydberg later became the first curator of the New York Botanical Garden Herbarium.

H. E. Hayward was a Wisconsin resident, but did extensive collections in the Black Hills in the summers of 1926 and 1927. He published his findings (Hayward 1928) that included 765 species. A complete collection of specimens (>2000 specimens) from this study is currently housed at the Milwaukee Public Museum.

Resident Botanists—Beginning in the early 20th Century botanists from South Dakota and Wyoming began to make significant collections in the study area. S. S. Visher worked for the South Dakota Geological Survey from 1910-1914. He conducted surveys of the northwestern portion of the study area using his motorcycle for collections of plants (Ode 2006). Visher is perhaps best known for his 1914 publication on the biology of Harding County. The largest collection of Visher's plants is housed at SDU, with smaller collections at BHSC and RM.

A. C. McIntosh was a botanist at the South Dakota School of Mines. He collected in the Black Hills from 1924-1930. His collections of over 1000 specimens are primarily at SDU. His checklist of plants (McIntosh 1931) is supplemented by a brief history of collections in the Black Hills and descriptions of habitats in the Black Hills.

W. H. Over was a homesteader in Perkins County, SD and had strong interests in nature, fossils and archaeology. Over was largely self-taught but employed by the University of South Dakota as assistant curator in 1912. He later became curator of the museum there. He published the *Flora of South Dakota* in 1932. Most of his plant collections are at SDU, with smaller numbers at US, GH, BHSC and RM.

F. L. Bennett was curator of the Herbarium at BHSC from the 1920s into the 1940s, and an avid plant collector. He had numerous short publications on the flora of the region. The largest collection of his plants is housed at BHSC with additional specimens at SDU, SDC and RM.

DISCUSSION

Today with modern field tools such as GPS and readily available transportation it is difficult to envision many of the challenges faced by the early collectors. Existing collections are evidence of their efforts and dedication. Early collections provide us with rare windows on history and opportunities to observe changes over periods greater than one lifetime.

We embarked upon this study to complete an ongoing regional database of vascular plant specimens that includes the relatively unknown and less accessible specimens collected from 1800-1940. While it was relatively easy to locate and enter data from recent collections, we wanted to incorporate the older collections presented here to make the database more valuable and more versatile. The database indicates that the early collections from 1800 to 1940 reached an apex in the decade of the 1920s with >7500 collections, most of which were collected with the coincidence of Hayward, McIntosh, and Over. It was not until the decade of the 1970s that the number of collections exceeded the number of collections in the 1920s. We hope that this study and continued additions to the database will facilitate future work on the flora of the region, aspects of climate change, historical research, and practical applications by land managers.

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Table 1. Herbarium acronyms, herbarium names and cities (from Thiers 2010).

Herbarium Acronym	Herbarium Name	City
BHSC	Black Hills State University	Spearfish
BM	Natural History Museum	London
GH	Gray Herbarium (Harvard)	Cambridge
K	Royal Botanic Garden	Kew
LIV	World Museum	Liverpool
MO	Missouri Botanical Garden	St. Louis
MIL	Milwaukee Public Museum	Milwaukee
NEB	University of Nebraska State Museum	Lincoln
NY	New York Botanical Garden	Bronx
PH	Academy of Natural Sciences	Philadelphia
PUL	Purdue University	West Lafayette
RM	University of Wyoming	Laramie
SDC	South Dakota State University	Brookings
SDU	University of South Dakota	Vermillion
US	Smithsonian Institution	Washington, D.C.

Table 2. Collectors in chronological order by years of active collection in the study area. Categories are described in the text. Locations are herbaria where plants are located.

Collector	Years	Category	Location
Lewis, M. & W. Clark	1804-1806	Missouri River	PH, BM, K, NY, GH, LIV
Nuttall, T.	1811	Missouri River	PH, BM
Bradbury, J.	1811	Missouri River	NY
Geyer, C. A.	1839	Missouri River	NY
Hayden, F. V.	1850s	Beyond	MO
Donaldson, A.B.	1874	Beyond	NY, PUL
Jenney, W.P.	1875	Beyond	GH
Forwood, W. H.	1880s	Beyond	GH, US
Canby, W.M.	1882	Beyond	NY
Rusby, W. S.	1887	Beyond	NY
Williams, T.A.	1890s	Beyond	SDC, RM, NY, US
Pratt, A.D.	1890s	Beyond	RM, NY
Wallace, E.J.	1890-1911	Beyond	SDC, RM, NY
Griffiths, D.	1892-1904	Beyond	RM
Carter, L.W.	1892-1897	Beyond	SDC, RM, NY, BHSC
Rydberg, P.A.	1892-1913	Beyond	SDC, RM, NY, GH
Hapeman, H.	1892-1939	Beyond	RM, NY
Bessey, C.E.	1898	Beyond	NEB
Murdoch, John Jr.	1908-1912	Beyond	RM, NY, BHSC
Moyer, L.R.	1909	Beyond	RM, NY
Nelson, A.	1910-1915	Beyond	RM
Carr, W.P.	1911-1914	Beyond	SDU, RM, SDC, BHSC, GH, NY
Miller, L.R.	1912	Beyond	NY
Visher, S.S.	1912-1914	Resident	SDU, RM, BHSC, NY
Pleass, W.	1913	Beyond	NY
Hitchcock, A.S.	1913-1927	Beyond	SDC, SDU, RM
Ball, C.R.	1915-1925	Beyond	BHSC
Pennell, F. W.	1915-1930s	Beyond	NY
Carter, E.E.	1916	Beyond	NY
Buechel, E.	1917-1923	Resident	Buechel Memorial Lakota Museum, St. Francis, SD
McIntosh, A.C.	1920s	Resident	SDU, RM, BHSC, NY
Over, W. H.	1920s	Resident	SDU, RM, BHSC, NY, SDC
Lee, H.E.	1920s-1940s	Resident	SDU, RM, BHSC, SDC
Hayward, H.E.	1926-1927	Beyond	MIL, RM, SDC, NY
Palmer, E.J.	1929	Beyond	NY, GH, MIL
Taylor, L. E.	1937	Beyond	NY
Fassett, N. C.	1939	Beyond	WIS, NY
Bennett, F. L.	1928-1940+	Resident	BHSC, SDU, SDC, RM