

The Planted Catalog: The Role of the Botanical Garden in Botany

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This article will investigate the role of the botanical garden in botany. What its role is and how it fills it. This article will take the Missouri Botanical Garden as a case study, drawing heavily from archival material comprised mostly of letters between Henry Shaw and the prominent botanists of his day. This study also draws on the prominent histories of the Missouri Botanical Garden. The analysis uses the philosophical tradition around reference in logic and language. This study argues that the botanical garden is a bridge between locality and herbaria. The order of the flora travels to the locality and the wildness of the locality travels to the flora. Both cross the botanical garden where the reference between the entry in the flora and the occurrence of the species in the wild is made explicit.

Introduction

Botanical gardens first arose as addenda to medical schools, to furnish the materia medica for the universities of Europe. As botany grew into its own field these gardens also grew to serve the botanical community, and as they did their purpose and role changed. This paper will examine what this new role was by looking at the founding of one botanical garden that became a center of botanical science in the world. The Missouri Botanical Garden was the dream of just one man who in 1857 set out to reproduce nature's plant bounty in a corner of the Midwest. Today the garden lies just south of downtown St. Louis. Although it is now surrounded by city, when the land was first purchased for the purpose the area was on the edge of where city met prairie. The Missouri Botanical Garden eventually grew into one of the preeminent botanical gardens in the world. I will write about the founding of the Missouri Botanical Garden as a study in how botanical gardens mediate the retrieval of specimens between localities and floras. I will discuss the retrieval of specimens from the perspective that this is an instance of information retrieval. Information retrieval has a rich literature in information science, but this is not an entirely new idea in biology either. The biologist Ernst Mayr in *The Growth of Biological Thought* wrote of biological classification that, "A classification, however, has a second function: to serve as a key to the information stored in the system." (Mayr 1982, p.239) Previously published articles, Tuers (2019) and Tuers (2020), outlined how the localities that botanists walked into were not disorganized and information neutral but rather aided in the storage and retrieval of specimens. Tuers (2019) and Tuers (2020) showed some ways that localities can act as a storage system for plant species. If this is true then the question can be asked: what role does the botanical garden play in this system? This paper argues that the botanical garden is a border space between the locality and the herbarium. The botanical garden is part of an Information Representation and Retrieval (IRR) system. IRR systems include archives, databases, and search engines. The organization of the botanical IRR system differs from these. The order of the flora moves through the herbarium, through the botanical garden, and into the locality. The locality moves into the garden through the herbarium and into the flora in the listing of the locality. We can see this if we look at the founding of a botanical garden, granted we use the right kind of botanical garden. This study requires a garden that was founded with a strong dedication to scientific research. It is important to investigate a botanical garden whose history tells us about how botanists used botanical gardens. For this study I will look at the founding of the Missouri Botanical Garden. I will take the founding to be the period beginning with the creation of the garden by Henry Shaw through the initial directorship of William Trelease.

The Missouri Botanical Garden was largely founded by one man, Henry Shaw. Shaw began the garden in 1857 and opened it to the public in 1859.¹ Shaw had come to St. Louis from England early in his life and encountered a frontier town imbued with French culture. Settling in St. Louis, Shaw made his fortune from real estate and retail. It was only after an early retirement that Shaw set about building the garden. He was helped in this enterprise by several leading botanists of the day. He carried on an extensive correspondence with the St. Louis physician and botanist George Englemann. Englemann was Shaw's closest botanical confidant. Shaw was also in communication with the botanists Asa Gray, William Jackson Hooker, and Joseph Dalton Hooker. Through the influence of these botanists Shaw founded the Missouri Botanical

Garden on science as well as aesthetics. Henry Shaw passed away in 1889. In his will he left the garden in the hands of a board of trustees. The board of trustees chose William Trelease to be the first director of the garden and he would head the garden until 1912.

Scope

William Trelease is included in this study because it was under his guidance that the garden grounds underwent a renovation. This renovation presents another opportunity to see how locality and herbarium met in the garden. Trelease's oversight of the garden during the time of the renovation partly justifies his inclusion in this study. Trelease's tenure has also been noted for being oriented toward research and the scientific community, making this time particularly fruitful for our investigation. The historian Kim Kleinman writes in *The Museum in the Garden*:

William Trelease, built the Garden's scientific affiliations through issuing the Annual Reports and building up the library, herbarium, and graduate program with Washington University. (Kleinman 1997, p.vii)

Trelease was suggested by Asa Gray to start the Shaw School of Botany at Washington University while Shaw was alive. Trelease was offered the position in the summer of 1885 and began his directorship of the Missouri Botanical Garden in 1889 after Shaw's passing. Trelease oversaw the 1897 redesign of the garden. The plan was made by Frederick Law Olmstead however little of it was ever implemented.

Since Shaw's death the Missouri Botanical Garden has been guided by two foci set out in Shaw's will. Shaw's will states the mission of the Missouri Botanical Garden as the:

cultivation and propagation of plants, flowers, fruit and forest trees, and other productions of the vegetable kingdom; and a museum and library connected therewith, and devoted to the same and to the science of Botany, Horticulture, and allied objects (Shaw's Will 1889, p.3)

The garden's original mission can be stated as "research, display, and education." (Kleinman 1997, Abstract) The botanists Shaw corresponded with impressed upon him the importance of orienting the garden toward research. The garden from the beginning had a scientific purpose. The botanist C.C. Parry, in a letter to Asa Gray, wrote that "He (Henry Shaw) needs in the first place to be convinced of the importance of having such a permanent official to give character to the establishment and make it a scientifically useful attraction to botanists." (Parry-Gray 4/2/84) Parry spoke for the botanical community when he wanted the garden to serve scientific interests. Notice that what would make the garden useful is the oversight of the entire garden, not of the library or herbarium only. The displays were considered part of the scientific enterprise. Shaw himself wrote that botanical gardens, "have done much to feed with oil the lamp of the science of the vegetable kingdom." (MBGA 1943, p.142)

Much of the treatment of the botanical gardens in this paper will have to do with the interaction between the herbarium and the garden. Eventually George Engelmann's herbarium made up a large share of the early garden's herbarium and it was the herbarium that was the major draw for botanists. C.C. Parry said that Shaw could attract botanists to his herbarium and library by taking on the Engelmann collection. (Parry-Gray 4/2/84) Scientific botany was part of the mission of the garden and

during the directorship of William Trelease there were even complaints from visitors that the garden was too focused on science. (Faherty 1989, p.52) It seems then that the Missouri Botanical Garden is just the sort of botanical garden this study requires.

Design of Garden

In his retirement Henry Shaw set about energetically planning and building the Missouri Botanical Garden. Shaw turned to George Engelmann for help and much of the correspondence between Shaw and Engelmann from this period took place while Engelmann was touring Europe. (Shaw-Engelmann 1856-1879) Shaw's letters to Engelmann were mostly about updates on the progress at the garden and requests for Engelmann to purchase books for the garden library and to purchase specimens for the herbarium. Shaw also carried on a lengthy correspondence with Asa Gray. Gray was the preeminent American botanist of the day. Gray, and Engelmann also, felt that the garden should serve botanical science, and that this should be on par with any aesthetic mission. Under the influence of Gray and Engelmann:

Shaw began to think of his creation not simply as a garden but as a *botanical* garden, where the knowledge of plants would be increased and spread throughout the world. His plantings, particularly in the systematically arranged beds to the south of the original main gate, became more synoptical and ordered, and the emphasis of the garden shifted from beauty primarily to incorporate both beauty and diversity. (Grove 2006, p.xv)

One place where diversity was incorporated into the garden was in systematic displays. In a systematic display, plants are arranged according to their place within a taxonomy. The early garden included systematic displays that an early visitor to the garden described thus, "This enclosed area is divided into suitable compartments, for the systematic arrangement of herbaceous and other plants of low growth." (Early Days 1930, p.119) The systematic displays were a place where the herbarium leaked into the garden. Which taxonomic system is used might differ. The taxonomic displays presented for the botanist species ordered the way he tried to order them in the wild. Shaw himself remarked that botanical gardens possessed, "systematic arrangements in a living state." (MBGA 1943, p.142)

Early in William Trelease's directorship an 11-point development plan was created for the garden. This plan sought to put the garden on a firm financial footing and focus its activities. It therefore ordered the priorities of the garden. The second point of this plan centered around the creation of geographically delimited displays. They were:

2. To add to its botanical usefulness and interest by the introduction, as opportunity offers, of plants representative of the American flora, so that, other things being equal, these shall ultimately be largely represented and may even preponderate outside the greenhouses, giving, then, in the garden, an epitome of the leading characteristics of our native flora. (Kleinman 1997, p.55)

The early garden included geographic displays. These were displays meant to represent the flora of a country, region, continent, etc. The geographic display is where the botanical locality leaked into the garden. When planning his garden Shaw made use of the prominent authors of his day. First among these was John Claudius Loudon. Shaw held Loudon in very high regard, Shaw:

used English practitioners and authors as the basis for his work, in particular Joseph Paxton and John Claudius Loudon, whom Shaw placed on a par with the eighteenth-century botanist Linnaeus and naturalist Alexander von Humboldt. (Grove 2006, p.7)

Shaw would state the position of Loudon in the design of the garden in an 1857 letter to George Engelmann. Shaw wrote, "all this am doing according to my own ideas-gathered from horticultural works of Loudon, McIntosh."² (Shaw-Engelmann 9/15/1857) Loudon's views can give insight into Shaw's thinking.

In his *An Encyclopedia of Gardening* Loudon addressed the layout of botanic gardens under the heading "Public Gardens for Instruction." (Loudon 1828, p.1028) Loudon advised the reader to label all plants in the garden with their systematic name. Loudon wrote, "Every plant ought to have its name painted on strong cast-iron tablets. On a beveled face, in letters so large as to be legible without stooping." (Loudon 1828, p. 1031) The naming of plants in the garden was echoed by point three in the 11-point plan:

3. To carry into execution, as rapidly as possible, a system of correctly naming and labeling all plants in the garden, with the exception of such as may be used in ribbon-gardening or for other exclusively ornamental purposes. (Kleinman 1997, p.55)

The garden followed the practice prescribed by Loudon in the *Encyclopedia of Gardening*. Trelease argued that, "Labelling plants in a botanical garden is 'one of the most important and difficult features of museum administration,'" (Kleinman 1997, p.68) On the topic of labeling plants in the garden, Kleinman remarks that, "Trelease stressed that 'a collection of living plants is essentially a museum collection' and that labels were (and are) the public's interface between the plant itself and what botanists and horticulturists have learned about it." (Kleinman 1997, p.68) This is an interesting idea as the naming of the plant in the display is meant to be a gateway into the flora where botanical metadata is contained. In advocating for the placing of names next to their instances Loudon was transposing taxonomy onto the botanic garden. Loudon wrote, "Such a collection should, in short, be a transcript of the catalogue of the garden." (Loudon 1828, p.1031) Loudon gave the example of the Paris Garden which had a menagerie that was divided into sections each devoted to a genus of animal. As with plants, the Paris Garden had taxonomic displays of animals. The animals were caged, rooted to the ground like the plants. Loudon also suggested the arrangement of native plants by country. (Loudon 1828, p.1031) Loudon's advocacy for geographic and taxonomic displays was influential for Henry Shaw.

The Missouri Botanical Garden was designed and arranged in order to reproduce an ideal, representative locality. Specimens were living in the ground yet already identified and grouped together by taxon as if they had been collected and stored in the herbarium. Many parts of the garden had either the geographic limitation of a locality or the systematic limitation of a taxon. One example was the garden's conservatory which, "housed six displays: the Coffee Plantation, the South African House, the Cycad and Fern House, the Palm House, the Economic House, and the Desert House." (Kleinman 1997, p.90) Half of these locations were systematic or geographic, they exemplified a taxon or a region. This was a part of a holistic plan for the entire garden. There are other examples, in his 1894 report Trelease made reference to "naturally arranged" (Trelease 1894, p.12) beds that were then in the garden. It is clear that geography and taxonomy were fundamental logics used to order the garden.³ Carol Grove, in *Henry Shaw's Victorian Landscape*, documents the practice of taxonomic display at the garden. She argues that, "to give a sense of order to the design he (Shaw) arranged plants by type-a reference to botanical systems of classification." (Grove 2006, p.44) Recall the third point of the 11-point plan mentioned above. "Correct naming" meant taxonomic naming and organization for the garden. The taxonomic identity of the plants in the garden were to be determined, and Loudon said, were then to be displayed.

In his 1896 article "Botanical Gardens" Nathaniel Lord Britton summed up the thinking of the time on the purpose of botanic gardens. Britton was the director of the New York Botanical Garden at the time. In "Botanical Gardens" Britton said that the botanical garden had four purposes one of which was "scientific or biologic." (Britton 2008, p.278) The emphasis on botanical science was echoed outside and inside the garden. Britton's "Scientific or Biologic" purpose was reflected in the advice Shaw received from prominent botanists. Later in the article Britton endorsed taxonomic displays saying, "The arrangement of the areas devoted to systematic planting, and the proper labeling of the species grown, are important duties of the scientific department." (Britton 2008, p.280) The naming of plants in the garden was considered by Britton to be a part of the scientific mission of the botanical garden. Nathaniel Britton's call to systematic display in 1896

suggests that taxonomic and geographic displays were gaining in popularity in botanical gardens at about the same time.⁴ The garden also viewed the geographic display as part of its mission. In the 1897 annual report William Trelease wrote:

For educational purposes, synoptically arranged groups must be especially planted. So far as I know, no botanical garden has ever presented a synopsis of the flora of the country in which it is situated (Kleinman 1997, p.66)

Here Trelease favored planting geographic displays in the garden. Trelease's comment that he knew of no garden that presented "a synopsis of the flora of the country in which it is situated" suggests that geographic displays were relatively new in 1897. Systematic and geographic displays were coming into vogue in the late 19th century.⁵

As can be seen in Trelease's quote the justification for geographic displays was educational. Education was often taken as the purpose of taxonomic arrangements, for example Kim Kleinman writes of the garden that, "Its systematic collections in the botanical garden, Museum Building, and arboretum had a didactic purpose." (Kleinman 1997, p.44) Ostensibly the purpose for taxonomic displays was education, this does not negate the argument of this paper but rather strengthens it. For these displays were educational *because* they mixed the locality and the flora. What we get is a view into a referential system that is formed from the four-part flora-herbarium-garden-locality system that will be discussed below. The garden is didactic because it makes this reference explicit.

Little of the 1897 Olmstead plan was implemented. However, Kleinman states that from the plan a section of the garden was developed into the North American tract which showcased the flora of North America. Of the land that made up the North American Tract, "twenty acres were to be planted as a collection of flora of the United States, and the remaining sixty-two acres represented flora of the world, the two merging, according to Trelease, into a 'single piece of artistic landscape.' Each would be synoptically arranged." (Grove 2006, p.171) We see that geographic displays were part of the Olmstead plan. In the design of the garden, consideration was also given to the taxonomic systems that would be imposed on plantings. William Trelease suggested that:

The North American Tract would use George Bentham and Joseph Hooker's "Genera Plantarum," an extension of the Jussieu and Candolle natural systems of plant classification. (Kleinman 1997, p.66)

And furthermore, he felt that:

the Engler and Prantl system "should prevail in the planting of the general synopsis in the larger tract, inasmuch as it represents more closely than the other the phylogeny of the different groups of plants." (Kleinman 1997, p.67)

Taxonomies were reflected in the floras of the day and Trelease was considering how the flora would be imposed onto the garden. What should be clear at this point is that built into the design of the garden were questions of how the flora and the locality would both be mixed in the garden. The flora leaked into the herbarium and the garden was a mixing pot between herbarium and locality.

A telling episode in the early history of the garden began with a December 13, 1884 correspondence between James Gurney, the Missouri Botanical Garden's first gardener, and Henry Shaw. (Gurney-Shaw 12/13/1884) In this letter Gurney asked Shaw for consent to send Kew Gardens leaves from several of the garden's agave plants. Gurney wanted to clear up discrepancies between the descriptions of agaves from an 1877 *Gardener's Chronicle* article and the identification of agaves at the Missouri Botanical Garden. Of interest here is that Gurney was referring to living plants not herbarium specimens. In a letter thirteen days later Gurney wrote to Shaw asking him to send, "specimens of agave now blooming in the gardens." (Gurney-Shaw 12/26/1884) These were samples from living plants that were being sent.

In a December 19, 1884 letter to Kew Gardens, Shaw mentioned Gurney's request. (Shaw-Hooker 12/19/1884) Shaw wrote that the agave specimens had been sent to Joseph Dalton Hooker. In what is probably a

later letter Gurney laments to Shaw that, "Past experience shows we cannot purchase agaves true to name." (Gurney-Shaw February 1885) The garden sent another package of agave specimens to John Baker at Kew Gardens. It was Baker who had written the *Gardener's Chronicle* article. Baker determined that one of the agaves Gurney had sent him was an entirely new species "near a *victoria regina*." (Shaw-Hooker 2/24/1885) This is much the way that specimens would be resolved in a herbarium. The sending of pieces taken from herbarium specimens was common for resolving taxonomy.⁵ The takeaway here is that James Gurney and Kew took very seriously the resolution of plants in the displays much the way that a botanist would at a locality or in the herbarium. This attempt to resolve a living specimen in the garden reveals to us that the garden worked as boundary area between the locality and the herbarium.

Analysis

We saw above that the garden was designed to display plants taxonomically and geographically. We saw this in the instances of the systematic display of cacti and the geographic display of the North American tract. Here we see that the Missouri Botanical Garden was bringing taxonomy out of the flora and into the garden and the geographic distribution out of the locality and into the garden. The botanical garden represents a border between the herbarium, which organizes plant life into an archive, and the locality. Trelease conceived of the herbarium as a continuation of the garden, he wrote, "I hope to arrange an instructive and attractive synoptical collection, supplementing those furnished by the living plants of the Garden." (Kleinman 1997, p.10) For Trelease the herbarium was a supplement to the garden.

Early in the history of the garden there were exceptions to order, but they were short lived. An interesting anomaly in the garden was a small batch of chaos that grew in the garden until order wiped it away. Kleinman writes, citing an article in *The Graphic*:

But, unlike the rest of the well-maintained Garden, this "was one of the corners where the old gentleman was wont to plant everything and anything, and then let anything grow as it pleased. A would-be chaos was the result." (Kleinman 1997, p.41)

Here what the writer in *The Graphic* describes is a small plot of fallow ground in the garden that existed when Shaw was still alive. This chaotic plot did not survive long because it was anathema to the order of the flora that was imposed onto the garden.

The Botanical Garden as Reference System

The view of specimen collection as taking plants out of an unorganized nature and depositing them into an organized archival space is not tenable. The difference between herbarium and locality is not as stark as this. A new relationship is required between the locality and the ultimate order of the flora. The first thing to notice is that the relationship is two way. Nature does not only come into the organized pages of the flora but organization goes into the wild in the form of the locality. The Missouri Botanical Garden was continuing a tradition, Kim Kleinman writes:

Traditional botanical gardens, as in the earliest Italian ones such as Padua and Pisa in the Sixteenth Century, had been defined by this systematic arrangement. The aim was to create a living example of the cabinet museum. Just as Shaw's Museum Building held more seeds than the *Inland Magazine* writer could imagine, this garden was meant to display, instructively, examples of the plant families. (Kleinman 1997, p.39)

The flora references plants in the wild through the herbarium and garden. The organization of the flora is in part a reflection of the organization found in the locality. If nature were actually chaotic then its organization would be completely artificial.

In the preceding pages I have painted a picture of a movement from flora to locality through the botanical garden and herbarium. The garden and herbarium then were organized as the middle point between two poles. The garden sat between the flora and the locality. The flora entry gives the name of a species, its subspecies, range, description, etc. It is interesting to note first that as one moves from locality to flora metadata increases and context decreases; that is, the plant eventually disappears and only metadata is found in the flora. Going in the other direction the name, description, collector, etc, all fall away as the plant moves into the locality. The flora makes references to the locality through the garden. Shaw remarked that botanical gardens, “stimulated the search for plants abroad.” (Henry Shaw 1943, p.142) This suggests such a reference between the garden and the locality. The scientific mission advocated by Trelease, Shaw, Britton, Gray, Parry, and Engelmann required the construction of such a reference system.

This reference system included the garden’s herbarium. Henry Shaw and the botanists he corresponded with often discussed the founding of the herbarium. Kleinman remarks that the early herbarium consisted of George Engelmann’s collection and the Bernhardt collection that Engelmann had purchased in Europe. The botanists Shaw consulted felt that the herbarium should occupy a focus of Shaw’s attention, Shaw had to be convinced of the importance of an herbarium that would be largely ignored by the visiting public. The herbarium along with the garden was important in building the reference that the scientific mission required.

In what follows I will investigate how reference is made between the flora and the locality. This investigation will draw heavily from philosophy. Two approaches in particular will help us understand what role the botanical garden played in the reference system.

Views of reference in philosophy I think offer a way of understanding the place of the botanical garden in this reference system. The flora refers, and the herbarium and botanical garden are where the reference is made explicit. One approach to reference comes from Gottlob Frege’s 1892 article “Sense and Reference.” Frege gave the example of people looking at the moon through a telescope. (Frege 1948, p.213) Frege said that in such a case the moon is the referent. The referent would be the same for all observers. The retinal image of the moon in the eye of the observer is the sense. The retinal image here sits between the objective moon and the subjective conception of the moon in the mind of the observer. This is why, Frege says, that one can talk about the evening star and the morning star as two different objects knowing full well that both are instances of the planet Venus. The planet Venus is a referent that has two senses, the morning star and the evening star. It was not trivial that “the morning star” and “the evening star” refer to the same object as they have different senses. The garden can be seen as playing the same role as the telescope, it mediates between the reference and the sense. By mixing the locality and the flora the herbarium and garden gradually shows the unique reference intended. They do this by gradually increasing or decreasing the context and metadata of the locality or flora.

Another approach to reference comes from the Austrian philosopher Alexius Meinong.⁷ (Meinong 2011) For Meinong reference is made to an object that may or may not exist. Objects that exist or subsist⁸ have being (*Sein*), objects that do not exist or subsist have non-being (*Nichtsein*). Meinong would say that extinct species reference objects with *nichtsein*. Synonyms in a flora would refer to an object having *sein*. This is perhaps not an edifying view on synonyms as it does not distinguish synonyms from other entries with *sein*. Meinong also posits the *sosein* as a list of characteristics that define the object. An object need not exist in order to have a *sosein*. So what the garden and herbarium do is build the *sosein* of the object that is referred to in the flora. It achieves this gradually along the way to the locality. This can be done for both extinct species and synonyms as well as any other plant species. Frege’s telescope makes explicit the *sosein* of the moon, for example that it is covered with craters. This then may be the role of the botanical garden, to make explicit the *sosien* of the species. The flora contains the *sosien* of a species, what I have here been calling metadata.

Conclusion

Mine is not the first attempt to explain how the botanical garden operates in science and not even the first to use the Missouri Botanical Garden as an example. This study owes a debt to Timothy Luke’s article, “The Missouri Botanical Garden: Reworking Biopower as Flora Power.” (Luke 2000) Whereas Luke draws on the work of Michel Foucault. My article attempts an analysis of the Missouri Botanical Garden that rests upon analytic philosophy and is internal to botany. There is however overlap in these treatments. Luke argued that, “Indeed, Shaw’s gardens were designed as engines to describe, order, and employ plants to serve productive imperatives in the economy and society.” (Luke 2000, p.311) Here Luke mentions “order” as one of the purposes of the garden. This article favors order but in the context of the scientific endeavor. Shaw’s garden was where plants were ordered. The herbarium was planted in the garden. At the same time the garden in many respects was designed to present a procession of localities each a geographic representation much wider than that found in any actual locality, North America in a few acres. Luke writes:

Nowhere, neither in Missouri nor elsewhere, looks like the garden’s grounds. Instead, soil, plants, water, and stones are artfully combined in heavily cultivated, purposely engineered, and specially dedicated artificial plots as idealized representations of Nature’s authentic bounty. (Luke 2000, p.314)

Examples of these idealized representations in the Missouri Botanical Garden include the North American tract and the South African House. Loudon suggested that beds represent plants native to a country. These “idealized representations of Nature’s authentic bounty” suggest the garden’s role as an idealization of localities.

The locality and the flora bleed into each other across the garden. The garden is labeled and organized by the taxonomy in the flora and represents a geography. I have shown that in the botanical garden the locality and the flora mix. The botanical garden contains much of the flora and much of the locality. This article can only lightly suggest that science generally is information retrieval. Does the garden mediate between flora and locality the way the telescope mediates between the astronomer and the heavens, or the micro scope between the cell and the biologist? The practice of science may be querying an IRR system in such a way as seen above. This is to my knowledge a new proposition. I urge this as a line of investigation for others to take up.

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Notes and References

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¹ This biographical sketch was informed by Styles (2012) and Faherty (1989).

² The McIntosh referred to is almost certainly Charles McIntosh.

³ Styles (2012) includes a photograph of an early taxonomic display of cacti. Following Loudon’s prescription a sign stands next to each plant with a sign in front of the bed reading “Group of Cereus.” (Styles 2012, p.56)

⁴ It is an interesting question whether this happened because in the late nineteenth century botany acquired the requisite knowledge of the plant kingdom that taxonomic debates could take place with greater frequency.

⁵ see the example of the Wildenow specimen in Tuers (2020).

⁶ See the example of *H. richarsonii* and *H. hispida* in Tuers (2020).

⁷Objects that subsist are usually relations between existent objects, Meinong gave the examples of “similarity and difference.” (Meinong 2011, p.79)

References

- Britton, Nathaniel. 2008. Botanical Gardens. In Genoways, H. H., & Andrei, M. A., *Museum origins: Readings in early museum history and philosophy*, 277-281. Walnut Creek(CA): Left Coast ; Oxford. 344 p.
- Faherty, W. B. 1989. A gift to glory in: The first hundred years of the Missouri Botanical Garden. Ocean Park(WA): Harris & Friedrich. 234 p.
- Frege, G. 1948. Sense and Reference. *The Philosophical Review*, 57(3), 209-230. doi:10.2307/2181485
- Grove, C. 2006. Henry Shaw's Victorian landscapes: The Missouri Botanical Garden and Tower Grove Park. Amherst(MA): University of Massachusetts Press, in association with Library of American History. 232 p.
- James Gurney to Henry Shaw. December 13, 1884. JSTOR Plants[Internet]. Available from <https://plants.jstor.org/stable/10.5555/al.ap.visual.kusdc2550>
- James Gurney to Henry Shaw. December 26, 1884. JSTOR Plants[Internet]. Available from <https://plants.jstor.org/stable/10.5555/al.ap.visual.kusdc2549>
- James Gurney to Henry Shaw. February 1885. JSTOR Plants[Internet]. Available from <http://plants.jstor.org/stable/10.5555/al.ap.visual.kusdc2552>
1943. Henry Shaw, Philanthropist and Prophet. *Missouri Botanical Garden Bulletin*, 31(7), 135-145. Available from <https://www.biodiversitylibrary.org/item/19152#page/172/mode/1up>
- Kleinman, K. J. 1997. The museum in the garden: Research, display, and education at the missouri botanical garden since 1859 (Order No. 9726040). Available from ProQuest Dissertations & Theses Global. (304407204). 184 p. Available from <https://login.pallas2.tcl.sc.edu/login?url=https://search-proquest-com.pallas2.tcl.sc.edu/docview/304407204?accountid=13965>
- Loudon, J. C. An Encyclopedia of gardening comprising the theory and practice of horticulture, floriculture, arboriculture, and landscape-gardening ... a general history of gardening in all countries .with suggestions for its future progress, in the british isles. London: Longman Rees Orme Brown Green, 1828[September 10, 2021]. Available from: <https://www.biodiversitylibrary.org/item/77015#page/7/mode/1up>
- Luke, T. W. 2000. The Missouri Botanical Garden: Reworking Biopower as Florapower. *Organization & Environment*[Internet]. [Cited September 10, 2021], 13(3): 305–321. Available from <https://doi.org/10.1177/1086026600133003>
- Mayr E. 1982. *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*. Cambridge (MA): The Belknap Press. 974 p.
- Meinong, A. 2011. Theory of Objects. In R.M. Chisholm (Ed.), *Realism and the background of phenomenology*, 76-117. Glencoe(IL): The Free Press. 308 p.
- Charles Parry to Asa Gray. April 2, 1884. Biodiversity Heritage Library[Internet]. Available from <https://www.biodiversitylibrary.org/item/225935#page/430/mode/1up>
- Henry Shaw to Sir Joseph Dalton Hooker, December 19, 1884. JSTOR Plants [Internet]. Available from <https://plants.jstor.org/stable/10.5555/al.ap.visual.kusdc2547>
- Henry Shaw to Sir Joseph Dalton Hooker, February 24, 1885. JSTOR Plants [Internet]. Available from <http://plants.jstor.org/stable/10.5555/al.ap.visual.kusdc2551>
- Shaw, H. 1889. *Henry Shaw's Will Establishing the Missouri Botanical Garden*. St. Louis(MO): Nixon-Jones Printing CO. Available from <https://archive.org/details/henryshawswille00treloog>
- Styles, T. E. 2012. Missouri Botanical Garden. Charleston, S.C: Arcadia Pub. 126 p.
- The Early Days of “Mr Shaw’s Garden.” *Missouri Botanical Garden Bulletin* [Internet]. 1930[September 10, 2021];18(7): 119-122. Available from <https://www.biodiversitylibrary.org/item/19016#page/169/mode/1up>
- Trelease, W. Fifth Annual Report of the Director. *Missouri Botanical Garden Annual Report*[Internet]. 1894[September 10, 2021];11-22. Available from <https://www.biodiversitylibrary.org/item/15208#page/2/mode/1up>
- Tuers, D. A Very Glabrate Form!: How a Diminutive Plant Enthralled Botanists on Both Sides of the Atlantic. *Journal of the South Carolina Academy of Science*[Internet]. 2019[September 10, 2021];7(1): 7-13. Available from <https://scholarcommons.sc.edu/jscas/vol17/iss1/4>
- Tuers, D. The Found World: The Role of Findability in the History of Botany. *Journal of the South Carolina Academy of Science*[Internet]. 2020 [September 10, 2021]; 8(1): 7-13. Available from <https://scholarcommons.sc.edu/jscas/vol18/iss1/5/>